THE LORICATES OF THE NEOZELANIC REGION.

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VII. Family Plaxiphoridae.

This family is characteristic of the Neozelanic Region, its members ranging from small to large, and comprising one of the smallest degenerate forms, and one of the largest Loricates known.

The family is circum-Antarctic and south temperate, ranging in very degenerate forms into the Tropics. North American shells, which have a superficial resemblance, belong to the family Mopaliidae, and the Neozelanic shells, though not closely related, have sometimes been referred to that family. The striking features of the group are the girdle characters and the posterior valve. The girdle is leathery, with sutural pores and corneous processes, or (in one genus only) scales, the posterior valve showing no projecting insertion plate. The anterior valve is always eight-slit, thus separating the family widely from the five-slit Cryptoconchids. It is very possible that the genera are not so closely allied phylogenetically as here placed, but a great deal of research is necessary in microscopic details to improve the classification. It is obvious that *Guildingia* is not very near to *Maorichiton*, while the latter has been confused with the Australian genus, *Poneroplax*.

The genera here admitted agree in having the anterior valve eight-slit, the median valves with one slit on each side, the insertion plate of the posterior valve reduced to an unslit callus, the teeth all long and not pectinated. The girdle covering shows tufts of corneous processes at sutural pores, and similar corneous processes scattered more or less thickly over the remaining surface. The external sculpture of the valves, a very characteristic feature of Loricate groups, varies in the genera. By this means the groups can be easily separated, as follows:—

External sculpture weak, shell very large .. .. *Plaxiphora.*
External sculpture with nodulous radials and wavy lines,
    sutural laminae continuous .. .. *Diaphoroplax.*
    sutural laminae separate .. .. *Maorichiton.*
External sculpture very fine wrinkles, radials obsolete,
    girdle covering scales .. .. *Vaferichiton.*
External sculpture obsolete, size very small .. .. *Hemiarthrum.*
External sculpture none, shell large and glossy .. .. *Guildingia.*
External sculpture very pronounced, mucro of posterior
    valve upturned .. .. *Frembleya.*

xiii. Genus Plaxiphora.

1847. *Plaxiphora* Gray, P.Z.S., 1847, 65, 68, 169. Type by monotypy *Chiton carmichaelis* Wood = *aurata* Spalowsky.

1853. *Euplaxiphora* Shuttleworth, Mittheil. Naturf. Gesell. Berne, 193. New name for *Plaxiphora* Gray.

Shells very large, oval, very weak sculpture, girdle large, leathery, with few scattered corneous processes, and sutural tufts of a few corneous processes; anterior valve with eight indistinct radial ribs over-ridden by concentric growth wrinkles; an indistinct similar rib separating the lateral areas of the median valves; posterior valve with mucro a little in front of the extremity of the valve, a posterior area being indicated, the same concentric sculpture as in the median and anterior valves. The sutural laminae and anterior insertion plate very large, the former practically discontinuous and one-slit, the latter eight-slit, no pectination; a strong callus developed in the posterior plate, a distinct medial sinus being present.

39. PLAXIPHORA AURATA.

(Plate vii., figs. 1-5.)

1795. *Chiton auratus* Spalowsky, Prodr. Syst. Nat. Test, 88, pl. 13, figs. 6a-b. "Die Südsee" = Falkland Islands.
1825. *Chiton raripilosus* Blainville, Dict. Sci. Nat. (Levr.), xxxvi., 547. Habitat unknown. Type in Coll. Blainville ex Leach.
1828. *Chiton carmichaelis* Wood, Index Test. Suppl., pl. 1, fig. 10 (pref. dated May 17). Cape of Good Hope. Type in Brit. Mus. (name ex Gray MS.).
1828. *Chiton carmichaelis* Gray, Spicil. Zool., pt. 1, p. 6 (dated July 1). Same specimen as of Wood.
1831. *Chiton setiger* King, Zool. Journ., V., 338. Tierra del Fuego. Type in Brit. Mus.
1880. *Tonicia atrata* Hutton, Man. N.Z. Moll., 114 (not of Sowerby). Macquarie Island.
1880. *Plaxifora campbelli* Filhol, Comptes Rendus Acad. Sci. (Paris), xci., 1095. Campbell Island, N.Z. Type in Paris Mus.
1881. *Choetopleura savatieri* Rochebrune, Bull. Soc. Philom., Paris, Ser. vii., Vol. v., 119. Straits of Magellan. Type in Paris Mus.
1884. *Choetopleura hahni* Rochebrune, Bull. Soc. Philom., Paris, Ser. vii., Vol. viii., 34. Patagonia. Type in Paris Mus.
1885. *Plaxiphora campbelli* Filhol, Miss. l'ile Campbell, iii., 2, 540.
1889. *Chaetopleura raripilosa* Rochebrune, Miss Sci. Cap. Horn, vi., Moll. H., 135 (= *setiger* King; two valves of type in Paris Mus. examined).
1889. *Chaetopleura hahni, id. ib.*, H., 136, pl. ix., fig. 4.
1889. *Chaetopleura savatieri, id. ib.*, H., 136, pl. ix., fig. 3.
1889. *Chaetopleura frigida, id. ib.*, H., 137, pl. ix., fig. 5. Patagonia (juvenile showing nodulous radial sculpture). Type in Paris Mus.
1893. *Tonicia subatrata* Pilsbry, Man. Conch., xiv., 201. New name for *Tonicia atrata* Hutton, 1880, Macquarie Island.
1893. *Plaxiphora superba* Pilsbry, Man. Conch., xiv., 319, pl. 68, figs. 55-61, ex Carpenter MS. New Zealand. Type in Brit. Mus.
1893. *Plaxifora campbelli* Pilsbry, Man. Conch., xv., 107. Translation of Filhol's early description.
1893. *Chiton raripilosus* Pilsbry, Man. Conch., xv., 116. Translation of Blainville's description.
1897. *Plaxiphora superba* Suter, Proc. Mal. Soc., ii., 188.
1897. *Plaxiphora subatrata* Suter, *id. ib.*, 190, figs. 7-11 in text (ex Pilsbry as new name).
1904. *Plaxiphora superba* Hutton, Index Faunae N.Z., 87.
1904. *Plaxiphora subatrata, id. ib.*
1905. *Plaxiphora subatrata* Hamilton, Col. Mus. Bull., No. 1, 36.
1909. *Plaxiphora aucklandica* Suter, Subant. Isl. N.Z., 2, pl. i., fig. 1 (December 22). Auckland Is. (juvenile specimen). Type in Canterbury Mus., Christchurch.
1909. *Plaxiphora superba, id. ib.*, 3.

1909. *Plaxiphora campbelli* Thiele, Rev. Chiton., pt. 1 (Chun's Zool., heft. 56), 27, pl. iii., figs. 39-40 (valves fig.).
1910. *Plaxiphora campbelli* Iredale, Proc. Malac. Soc., ix., 94, 95.
1911. *Plaxiphora aurata* Pilsbry, Nautilus, xxv., 36.
1913. *Plaxiphora aucklandica* Suter, Man. Moll. N.Z., 18. Atlas, pl. 3, fig. 10.
1913. *Plaxiphora superba* Suter, id. ib., 21. Atlas, pl. 2, fig. 6; pl. 3, fig. 14; 1077; pl. 32, fig. 11; 1079.
1914. *Plaxiphora aucklandica* Iredale, Proc. Malac. Soc., xi., 31 (= *campbelli*).
1915. *Plaxiphora aurata* Iredale, Trans. N.Z. Inst., 47, 1914, 420, 424.
1916. *Plaxiphora aurea* (*sic*) Hedley, Austr. Antarct. Exped., 1911-1914, Sci. Rep. Ser. c., Zool. iv., 35 (November 6). Macquarie Island.
1917. *Plaxiphora campbelli* Dupuis, Bull. Mus. Nat. d'Hist. Nat. (Paris), 534 (type examined).
1917. *Plaxiphora raripilosa*, *id. ib.*, 535 (type in Paris Mus. examined!)
1922. *Plaxiphora raripilosa* Ashby, Trans. Roy. Soc. South Austr., xlvi., 576 (type examined!!).
1924. *Plaxiphora raripilosa* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd., 77 (N.Z. Moll.), 8. (North Is., Auckland I., Campbell I.).
1926. *Plaxiphora aurata* Finlay, Trans. New Zeal. Inst., 57, 333.

We do not propose to deal with the curious nomination of the South American form in detail, but will give the history of the Neozelanic names.

Thus Hutton in 1880 included *Tonicia atrata* Sowerby, copying Reeve's description, but added: "Our species (from Macquarie Island) agrees very well with Reeve's figure, but not with his description. The anterior terminal area is distantly radiately ribbed, and the lateral areas are sometimes defined by a single rib. The umbone of the posterior valve is more posterior than in the drawing, and the valves are of a uniform brown colour. The mantle is of the same colour as the valves. Sowerby gives the Falkland Islands as the locality for this species, but Reeve doubts it and gives no habitat at all."

The same year Filhol described *Plaxifora campbelli* very shortly. Translated by Pilsbry, his description reads: "Allied to *P. biramosa* Quoy, but differing in the greenish colour, by the last valve being covered with projecting concentric lines, and by the presence of very bushy bunches of hairs, not binary. Campbell Island."

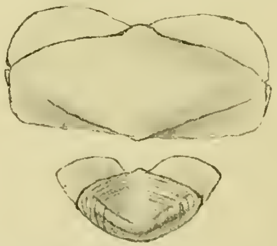
No specimen has been seen with very bushy bunches of hairs, but the detailed description Filhol gave a year or two later left no doubt as to the applicability of the name, as was later recognised by examination of the type.

In the Manual of Conchology, Pilsbry reproduced Hutton's remarks, given above, under *Tonicia atrata*, and added: "These characters seem to me to indicate a distinct species, which may be called *Tonicia subatrata*."

Further on he introduced *Plaxiphora superba* solely from Carpenter's MS. description and figures, as follows: "Shell large, oval, elevated, the dorsal ridge acute; mucro subposterior, little elevated. Reddish-olive, maculated with darker and paler. Valves nearly rectangular, but well indented at the sutures, having a 'false apex' in front. Lateral areas having indistinct, subobsolete radiating riblets. Anterior valve subangled by eight radii, which slightly undulate the peripheral margin; otherwise nearly smooth, except for growth lines. Interior: posterior valve having the insertion-plate elevated, rounded, interrupted in the middle behind by a very narrow, deep sinus. Anterior valve having eight, central valves one slit, teeth long, slightly striated and slightly thickened at the edges of the slits outside. Sinus narrow, short. Sutural laminae continuous over the anterior false apex. Girdle tough, black, leathery, hardly sinuated behind, smooth, with a few bristles at the sutures and around the margin. Length 60, breadth 40 mm., divergence 110°. New Zealand."

Pilsbry then relegated *Plaxifora campbelli* Filhol, to the list of insufficiently described Chitons, overlooking Filhol's extended and accurate description, published a little later than the brief diagnosis above quoted. Under the same heading he translated the description of *Chiton raripilosus* Blainville, as follows: "Body oval, thick, convex, not carinated; girdle moderate, beset with large black flexible hairs, a little more numerous around the periphery. Shell of 8 thick valves, a little carinated; the two end valves a little smaller, the anterior semicircular, with 9 large teeth of insertion, the posterior transversely oval, with the insertion-plate entire, winged anteriorly; intermediate valves alike, having a rounded projection in the middle of the anterior border; the plate of insertion somewhat winged, with a single deep slit on each side. Colour, brown on the girdle, the valves russet white outside and within. Length more than 3 inches. Habitat unknown. (Coll. Blainv. from Dr. Leach). Seems to be a *Plaxiphora*. Rochebrune has identified it with *Chiton setiger* King (Polyplac., Cape Horn, 1889)."

When Suter four years later reviewed the Neozelanic Loricates he admitted *P. superba* from Pilsbry's description, and then fully described *Plaxiphora subatrata*, following up Pilsbry's indication of his *Tonicia subatrata*, thus: "Shell large, oval, moderately elevated; side slopes slightly arched; ridge rounded. Colour reddish-brown, dirty-pink at the jugum. The head valve strongly concentrically ridged, and with eight radiate ribs, which, however, sometimes become obsolete. Central valves beaked anteriorly and posteriorly; the anterior beak is rather prominent, rounded, the posterior one pointed, forming an angle of about 120°, and is formed by the outer layer only. The whole surface of the median valves is strongly concentrically striated, following the outline of the anterior beak over the jugum. Lateral areas distinct, raised, with two ribs, which are sometimes flatly nodulous, owing to their being crossed by concentric lines; in some specimens the diagonal ribs are only very faint, or disappear altogether; on the other hand, their number may increase to four, but the anterior and slit-rib are always the more prominent. Posterior valve small, depressed, concentrically ridged, slightly beaked anteriorly; mucro inconspicuous, terminal. Interior white, tinged with light-blue. Sinus shallow, rounded. Sutural laminae rather broadly rounded. Insertion-



Copy of Thiele's figures of *Plaxiphora campbelli* Filhol (type).

plates low. Anterior valve with eight irregularly distributed slits; teeth sharp, striated on the outer side; the whole of the interior light-blue. Intermediate valves with one slit on each side; posterior tooth broad; a strong light-blue callosity extends between the two anterior teeth. Posterior valve with the insertion-plate thick, rounded, without slits, a small sinus in the middle behind. In all valves the eaves are very narrow and spongy. Girdle wide, narrower at both ends, leathery, tan-colour, dark brown when dry; at each suture a pore with long corneous bristles, six in a tuft, and alternating with these pores a second row of smaller ones is situated near the margin. In front of head and tail valve six smaller pores with short bristles. The margin beset with horny bristles of varying size. Length 75, breadth 45 mm., divergence 125° (spirit specimen). A specimen from Campbell Island, belonging undoubtedly to the same species, is of olive-brown colour, the jugum horny-yellow. The anterior valve has well-pronounced radiating riblets, the concentric lines on all the valves are less distinct, and the posterior beak on the central valves is almost obsolete. The ribs on the lateral area of the intermediate valves do not run down to the margin, but are intercepted by a broad, smooth, concentric band, extending along the sides and anterior part of the valves. The valves are more depressed, divergence 135°. Habitat, Macquarie Island. Campbell Island."

The specific name *subatrata* then came into use, while *superba* was left indefinite.

A most unaccountable lapse was made by Suter when he described a juvenile as *Plaxiphora aucklandica*: "Shell small, elongately oval, depressed, valves very fragile (animal preserved in formol!), dorsal ridge subangular. Colour light brown, jugal tract whitish, white dashes on the sides. Girdle wide, black, with sutural tufts of very long bristles. Anterior valve short and broad, flattish, with eight granulated radial ribs. Intermediate valves wide, depressed, the jugum smooth, with very fine growth lines; lateral areas not raised, with two narrow granulated ribs, the interspaces smooth. Posterior valve smooth, small, the mucro posterior, the hind slope nearly straight. Girdle broad, with very prominent sutural tufts round the anterior and a few round the posterior valve; a second series of tufts with shorter bristles near the margin, which is beset with short brownish hairs: remainder of the girdle quite naked, smooth. Colour of the valves light brown; intermediate and tail valves usually with a dorsal triangular white area, with a longitudinal brown median line; one or two white elongated spots are mostly present on the pleural, rarely on the lateral area; girdle black. Length, about 15 mm. Divergence, 105°. The specimen could not be disarticulated without completely destroying the valves. Habitat: Musgrave Harbour, Auckland Islands."

In the meanwhile the South American *"setiger"* had been identified by Sykes as the same shell Gray had described from the Cape of Good Hope as *carmichaelis,* which had been figured by Wood. Iredale, working at the British Museum, confirmed this determination, and also Thiele's separation of the two Neozelanic species confused under *biramosa,* and used for the second species *campbelli* Filhol = *superba* Pilsbry = *subatrata* Pilsbry, as of Suter. Receiving many specimens from the Falkland Islands, Iredale could not separate these, and therefore concluded that the South American name should be used for the Neozelanic shells. However, Pilsbry pointed out that Spalowsky had, many years previously, given a beautiful figure of this species, under the name *C. auratus,* the locality, "Die Südsee," being written, but obviously a Falkland Island shell, figured. Consequently, Iredale advocated *P. aurata*, citing as synonyms, *carmichaelis, setiger, campbelli, savatieri, hahni, frigida, superba, subatrata* and *aucklandica*. A few years later Dupuis, overlooking Iredale's paper, revived *raripilosa* for *setiger*, pointing out that Rochebrune had previously noted this identity. Dupuis also added *veneris* Rochebrune, but the description absolutely forbids this, as "central areas sulcate, the sulci imbricating," is not a feature of the present shell. Rochebrune had mentioned that two valves of Blainville's type of *raripilosa* were in the Paris Museum, and Dupuis also accepted, and Ashby commented upon the type, but according to Blainville his specimen was in his own collection, not in the Paris Museum.

Comparison of the huge Macquarie Island shells with the Falkland Islands species still maintains their very close relationship, and if any differential value can be given at present at most it would be subspecific. As above noted, there are plenty of synonyms and the species is very easily recognisable. The preceding descriptions give all the characters necessary, and we will only add the note that the immature show the lateral ribs, and the faint ribbing on the anterior valve to have a slight but distinct nodulose character. Suter's juvenile *"aucklandica"* was only 15 mm., while it ranges as adult to 120 mm.

Station: On rocks in littoral zone; under surface of stones at low water.

Though common and conspicuous at the sub-Antarctic Islands, it is not well known from the mainland, though it has been recorded from there.

xiv. Genus MAORICHITON.

1914. *Maorichiton* Iredale, Proc. Mal. Soc., xi., 32, March. Type by original designation *Chiton caelatus* Reeve.

Iredale introduced this subgenerically with the definition: "The small size, definite sculpture, and peculiar posterior valve determine this subgenus; the tegmentum of the posterior valve ends in a pointed plane mucro forming a triangle.

"Shells small, elongate oval, depressed, girdle with corneous processes generally bunched at the pores, sometimes scattered over the surface; posterior valve with mucro terminal; external sculpture coarse. General features as in *Plaxiphora*."

The species of *Maorichiton* are not well distinguished, as the sculpture varies in degree, and young ones are sometimes well sculptured and sometimes nearly smooth. Intensive collecting may solve the problem of the species, the so-called *'zigzag'* being still a puzzle.

40. MAORICHITON CAELATUS.

(Plate vii., figs. 6, 7.)

1847. *Chiton caelatus* Reeve, Conch. Icon., iv., pl. xvii., sp. & fig. 101. New Zealand. Type in British Museum.

1872. *Tonicia zigzag* Hutton, Trans. New Zeal. Inst., iv., 1871, 180. Hab. ? = N.Z. Type in Dominion Museum, Wellington.

1873. *Acanthopleura caelatus* Hutton, Cat. Marine Moll. N.Z., 49.

1874. *Chiton (Plaxiphora) terminalis* Smith, Zool. Voy. Erebus & Terror, Mollusca, 4, pl. 1, fig. 13, ex Cpr. MS. (Coll. Capt. Bolton and Stokes). New Zealand (restricted locality), Auckland. Type in British Museum.

1880. *Acanthopleura caelata* Hutton, Man. N.Z. Moll., p. 115 (= *zigzag olim*).

1880. *Mopalia ciliata Hutton, id. ib.*, 116.

1880. *Plaxiphora terminalis* Hutton, *id. ib.*, 116.
1893. *Plaxiphora terminalis* Pilsbry, Man. Conch., xiv., 326, pl. 51, fig. 14.
1893. *Plaxiphora terminalis* var. *zigzag* Pilsbry, Man. Conch., xiv., 327, ex Carpenter MS. New Zealand. Type in British Museum.
1893. *Plaxiphora caelata* Pilsbry, Man. Conch., xiv., 328, pl. lviii., figs. 21-22.
1893. *Streptochiton cupreus, id. ib.*, "ex Cpr. MS. *olim*," as synonym.
1897. *Plaxiphora caelata* Suter, Proc. Malac. Soc., ii., 189, July.
1904. *Plaxiphora caelata* Hutton, Index Faunae N.Z., 87.
1905. *Plaxiphora caelata* Hamilton, Col. Mus. Bull.. No. 1, 36.
1910. *Plaxiphora caelata* Iredale, Proc. Mal. Soc., ix., 92. June.
1913. *Plaxiphora caelata* Suter, Man. N.Z. Moll., 19. Atlas, pl. 2, fig. 5. 1098.
1913. *Plaxiphora terminalis* Suter, Man. N.Z. Moll., 1078.
1915. *Plaxiphora caelata* Iredale, Trans. N.Z. Inst., 47, 1914, 424.
1921. *Plaxiphora (Maorichiton) lyallensis* Mestayer, Trans. New Zeal. Inst., liii., 1920, 176, pl. xxxviii., figs. 7-8. July 4, 1921. Lyall Bay, Cook Strait, Wellington. Type in Dominion Museum, Wellington.
1924. *Plaxiphora caelata* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd., 77 (N.Z. Moll.), 8. North Island.
1926. *Plaxiphora zigzag* Mestayer, Trans. N.Z. Inst., 56, 584, pl. 100, figs. 5-6. Type figured.

Reeve's description reads: "Shell oblong-ovate, somewhat attenuated anteriorly, terminal valves, the posterior of which is small and slanting, and lateral areas of the rest broad-ribbed and neatly curved with close-set waved laminae; central areas very minutely reticulated; beautifully ornamented with green and pink; ligament horny, here and there bristly. Hab., New Zealand, Earl.

"Care must be taken not to confound this beautiful species with the *C. setosus.*"

Nearly thirty years later Smith described *Chiton terminalis*: "Shell elongately ovate, rather elevated, roundly angled along the top of the valves, black or bluish-black, with a white wedge-shaped stripe, with a black one within it down the centre of the valves, forming a continuous white stripe, divided by a black one along the centre of the shell; in some specimens with a few short white dashes diverging from the radiating ridges. The intermediate valves mucronated, bisected on each side by one raised radiating rib, the posterior margins sinuated and thickened by coarse concentric lamellae; the entire surface is covered with minute striate-wrinkling, those near the ridge being coarser than the rest and radiating from it like the webs from the shaft of a feather. The posterior terminal valve has the mucro quite terminal. The anterior valve radiately eight-ribbed (at times one or two additional minor ones are present), with diverging oblique striations on each side of them. Interior of valves greenish-blue; valve lobes whitish, the sinus between them deep; the hairs or bristles on the mantle-margin are short, few and horny, those arising from the nine pores being thicker than the rest. Largest specimen (in a contracted state), 42 mm. long; width of valves 20. An average specimen. Length, 25 mm.; width, 11. Habitat: New Zealand (Coll. Bolton and Capt. Stokes). The central white stripe with the black one within it appears to be very constant."

A couple of years before Hutton had described *Tonicia zigzag*: "Oblong; mantle slightly tomentose; valves slightly flattened on each side, but not keeled; posterior margins sloping backwards into a point, crenulated on the sides; anterior valve with nine radiating ridges, crossed by fine concentric zigzag striae; lateral areas with two on each side; radiating ridges crossed by fine zigzag striae; posterior and median areas with very fine oblique striae, diverging from the dorsal line outwards and forwards, crossed by others diverging outwards and backwards, forming an "engine-turned" pattern. Length, .88 inch; breadth, .31 inch. Colour: Mantle white, valves greyish black, with a white stripe on each side of the dorsal line; interior greenish blue. A single specimen is in the Colonial Museum; locality not stated."

Hutton sank his *zigzag* as a synonym of *caelata,* but Pilsbry questioned this, and Iredale revived Hutton's name for a little species from Lyttelton, but Miss Mestayer has figured Hutton's type, and it is quite referable to *caelata.* Smith's *terminalis* was exactly a synonym, and this is explained by the fact that Carpenter had described in MS. shells in the British Museum as *Streptochiton cupreus,* which he afterwards determined as Reeve's *caelata.* These specimens were used by Smith for comparison, and were undoubtedly different from his *terminalis*, as they were *biramosa* Quoy and Gaimard.

Recently, Miss Mestayer has described *P. lyallensis* thus: "Shell oval, flatly arched, side slopes straight, surface dull. Anterior valve with eight radial ribs, rendered slightly nodulous by the irregularly spaced growth lines; the spaces between the radials appear smooth, but a strong pocket lens shows traces of V-like sculpture. Median valves squarish, not beaked, nearly smooth; lateral areas raised, marked off by a strong semi-nodulous rib, the central portion covered with very fine V-like sculpture; the jugal areas with traces of microscopic striae and pitting; the pleural areas with a few horizontal wrinkles in a shallow groove anterior to the lateral rib; this groove is most distinct in valves 4 to 6. Posterior valve small, mucro terminal, slightly upturned; pleural areas bounded by a strong marginal rib, no sculpture. Interior deep blue-green, sutural plates white, sinus rather broad, convex in centre, with a central dark brown spot and a yellow tinge on either side of it. The anterior valve has eight slits, the edges of which are thickened and upturned; the insertion plates lightly grooved. The median valves also have the insertion-plates grooved and one-slit. The posterior valve has a thickened rib-like insertion-plate. Colour: Ground-colour, greenish-brown, irregularly barred with cream, the sixth valve cream, with irregular zigzags of the ground colour; the anterior valve uniform brown. Girdle moderately broad, with a marginal fringe of soft short bristles, and about twenty tufts and pores adjoining the valves; when alive it was a greenish colour. Measurements: Length, 35 mm.; breadth, 20 mm. Lyall Bay, Cook Strait, New Zealand."

Through the courtesy of the Director of the Dominion Museum we have been enabled to examine this specimen, and find it is merely a smooth aberration of the common species.

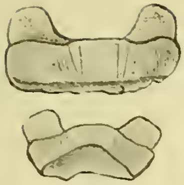
Station: Under stones between tide marks.

41. MAORICHITON METONOMAZUS, *sp. nov.*

1909. *Plaxiphora* sp. Thiele, Rev. Chitonen, Chun's Zool., heft. 56, 28, pl. iii., figs. 46, 47. Lyttelton, N.Z., in Hamburg Museum.

1914. *Plaxiphora (Maorichiton) zigzag* Iredale, Proc. Malac. Soc., xi., 34. March. Lyttelton, N.Z.

1915. *Plaxiphora zigzag* Iredale, Trans. N.Z. Inst., 47, 1914, 421, 424.



Copy of Thiele's figures.

Thiele described a small shell from Lyttelton, and Iredale determined it from the description as Hutton's *zigzag*, but Miss Mestayer's figure of Hutton's type shows this to be incorrect. We assign a name to the shell, which may be found later to be more distinct than we deem it at present.

Shell small, generally much eroded and weed-covered when alive, sculpture at edges wrinkly and similar to that of *caelata*, greenish; girdle white with black bands; corneous processes at sutures, and a few scattered over the girdle. Upon dissection valves are more flattened; sutural laminae shorter, green, and widely separated, side slit very short; anterior teeth short; posterior valve broad, callus rounded and well developed. Contrasted with the typical *caelata*, the internal green coloration, which attracted Thiele, is very noticeable; the breadth of the valves, and the shortness of the teeth and sutural laminae being also characteristic, as is the posterior valve.

Dimensions: 16 x 8 mm.

Station: Between tide marks. Type from Lyttelton Harbour, New Zealand. Apparently distributed throughout New Zealand.

42. MAORICHITON MIXTUS.

(Plate vii., figs. 9-12.)

1914. *Plaxiphora* (*Maorichiton*) *mixta* Iredale, Proc. Mal. Soc., xi., 33, pl. ii., figs. 12, 15, 16, 18. March. Sunday Island. Kermadec Group. Type in Canterbury Museum, Christchurch, New Zealand.

1915. *Plaxiphora mixta* Oliver, Trans. N.Z. Inst., 47, 1914, 557.

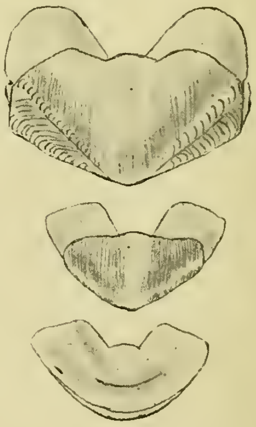
Iredale's description reads: "Shell small, elongate, somewhat elevated; valves keeled and beaked; girdle densely hairy. Coloration generally black, white and green. Some specimens agree most accurately with E. A. Smith's description of his *C. terminalis* as regards coloration; sometimes dark blue, with white markings; rarely rich brown, with white markings; girdle always green. Anterior valve with eight radiating ribs not much elevated, and between each rib wrinkled V-sculpture. Median valves with the lateral area bounded on both sides by strong raised, somewhat nodulous ribs, between which appears a transversely wrinkled or V-sculpture; the pleural areas sculptured, with irregular fine wavy longitudinal ridges more pronounced at the edges, and becoming very fine on the dorsal area. Posterior valve triangular, with the mucro terminal, and the posterior area reduced to raised ribs; the anterior portion sculptured like the pleural areas of the median valves. Inside coloration deep blue-green. Anterior valve with projecting insertion-plate, with grooved, widely spaced somewhat irregular teeth; the slits eight in number. Median valves with projecting insertion-plate with one slit; sutural laminae widely placed apart and whitish in colour, inside as well as out. Posterior valve with no insertion-plate, but a callused semicircular ridge, which is much exceeded by the pointed tegmentum. Girdle densely covered with long hairs, which are somewhat longer and bunched at the pores. Young specimens show the sculpture to be much stronger in the juvenile, the pleural areas of the median valves having well marked and deep longitudinal ridges, and the lateral areas are bounded by heavy, somewhat nodulous ribs. The majority of adult specimens are covered with marine growths, and the tegmentum is much eroded. Length of type 32, breadth 15 mm. Habitat: Sunday Island, Kermadec Group (type); ? Macauley Island, Kermadec Group. Station: At Sunday Island it was rarely found in crevices of rocks between tide marks. I collected a few specimens in deep rock pools between tides, but I am not satisfied that these are identical with the one here described."

43. MAORICHITON SCHAUINSLANDI.

(Plate vii., fig. 8.)

1909. *Plaxiphora schauinslandi* Thiele, Revision Chitonen, pt. i. (Chun's Zoologica, heft. 56), 28, pl. iii., figs. 41-43. Chatham Islands, New Zealand. Type in Berlin Museum, Germany.
1904. *Chaetopleura hahni* Wissel, Zool. Jahrb. Abt. Syst., 20, 73. Error only of nomination.
1905. *Plaxiphora glauca* Suter, Journ. Malac., xii., 66. Not *P. glauca* auct. of Australia.
1909. *Chaetopleura hahni* Suter, Nachr. Blatt. Deutsch. Mal. Gesell., 600. Correction of Wissel's error.
1913. *Plaxiphora glauca* Suter, Man. N.Z. Moll., 20. Atlas, pl. 3, fig. 13.
1913. *Plaxiphora albida* Suter, Man. N.Z. Moll., 1079. Not *P. albida* auct. of Australia.
1915. *Plaxiphora glauca* Iredale, Trans. N.Z. Inst., 47, 1914, 421.

A curious large form of *Maorichiton* lives at the Chatham Islands, and was first recorded as distinct by Wissel, who named it *Chaetopleura hahni,* a synonym of the South American form of *Plaxiphora aurata.* Then Suter received specimens and recorded them as *Plaxiphora glauca,* an Australian species. As the shells were referable to *Maorichiton,* while the Australian shells belong to *Poneroplax,* the association was obviously incorrect. Thiele did the correct thing and described them as a new species, *Plaxiphora schauinslandi.* The notable features were large size and coarse sculpture, and Iredale, ignoring geographical divisions, suggested their identity with *terminalis* Smith, but the type locality of the latter was Auckland. Consequently, *schauinslandi* must be used for this Chatham Island shell, and it is here regarded as specifically distinct.



Copy of Thiele's figure of *Plaxiphora schauinslandi.*

The shell is larger than the mainland forms, similarly elongate in shape, sculpture of same form, but much coarser, the wrinkle sculpture standing up as ridges, while the lateral ribs are strong and cut into elongate bars, the anterior valve ribbing similarly striking, the noduling separate. In some cases the shell is smoother, even as on the main land, but even then the sculpture is coarse.

XV. Genus DIAPHOROPLAX.

1914. *Diaphoroplax* Iredale, Proc. Mal. Soc., xi., 32. March. Type by original designation, *Chiton biramosus* Quoy and Gaimard.

This beautiful endemic Neozelanic form may not be referable to this subfamily, but more study will be necessary to determine this point. The study of the megalaesthetes and sections may assist in this direction.

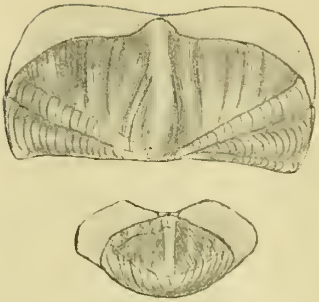
Iredale stated: "The exterior of the valves (which are very solid) is sculptured, whilst the sutural laminae are connected, a feature otherwise quite foreign to the genus (*Plaxiphora s.l.*), and the posterior valve is quite differently formed.

"Superficially, this shell has the appearance of the true *Plaxiphora*, but externally is separated by the complex sculpture, and internally by the continuous sutural laminae and structure. The teeth are fluted and striated throughout, while no fluting nor striation occurs in *Plaxiphora s.str.* at any stage. The posterior valve also shows striation on the callus, which is definitely sinuate medially.

44. DIAPHOROPLAX BIRAMOSA.

(Plate vii., figs. 15, 16.)

1835. *Chiton biramosus* Quoy and Gaimard, Voy. de l'Astrol. Zool., iii., 378, pl. 74, figs. 12-16. French Pass, Tasman Bay, N.Z. Type in Paris Museum.
1836. *Chiton biramosus* Deshayes, Hist. Anim. s. Vert. (Lam.), Ed. 2, vii., 516.
1843. *Chiton biramosus* Gray, Travels in N.Z. (Dieff.), ii., 246.
1872. *Tonicia corticata* Hutton, Trans. N.Z. Inst., iv., 1871, 180. Habitat: ?. Type in Colonial Museum, Wellington, N.Z.
1872. *Acanthopleura complexa* Hutton, Trans. N.Z. Inst., iv., 1871, 181. Habitat: ?.
1872. *Acanthochaetes biramosus* Hutton, Trans. N.Z. Inst., iv., 1871, 181.
1873. *Acanthopleura ciliata* Hutton, Cat. Mar. Moll. N.Z., 49 (Pitt's I.).
1873. *Acanthochaetes biramosus* Hutton, Cat. Mar. Moll., N.Z., 50 (includes *corticata*).
1880. *Plaxiphora biramosa* Hutton, Man. N.Z. Moll., 116.
1893. *Plaxiphora biramosa* Pilsbry, Man. Conch., xiv., 39, pl. 68, figs. 51-54.
1897. *Plaxiphora biramosa* Suter, Proc. Mal. Soc., ii., 188. July.
1904. *Plaxiphora setiger* Wissel, Zool. Jahrb. Abt. Syst., 20, 603. Error only.
1904. *Plaxiphora biramosa* Hutton, Index Faunae N.Z., 86.
1905. *Plaxiphora biramosa* Hamilton, Col. Mus. Bull., No. 1, 36.
1909. *Plaxiphora setiger* (Wissel) Suter, Nachr. Blatt. Malac. Gesell., 1909 (2), 74. Correction.
1909. *Plaxiphora biramosa* Thiele, Revision Chitonen, pt. i. (Chun's Zoologica, heft. 56), 26, pl. iii., figs. 37-38.
1910. *Plaxiphora biramosa* Iredale, Proc. Mal. Soc., ix., 93 (= *cuprea* Cpr. B.M.).
1913. *Plaxiphora biramosa* Suter, Man. Moll. N.Z., 18, 1078. Atlas, pl. 3, fig. 4; pl. 2, fig. 11.
1915. *Plaxiphora biramosa* Iredale, Trans. New Zeal. Inst., 47, 1914, 424.
1924. *Plaxiphora biramosa* Powell, N.Z. Journ. Sci. Tech., 6, 285.



Copy of Thiele's figure of *Plaxiphora biramosa* Q. & G. (type).

It is curious that such a glorious Loricate as this is when alive should have a somewhat chequered history. It was well described by Quoy and Gaimard, thus: "Chiton, corpore ovali planiusculo, rubro, duabus seriebus pilis binis cincto, margine villoso; valvis planiusculis, viridi-rubentibis aut albidis, antice transversim striatis.

"Cet oscabrion est ovalaire, allongé, â manteau nu, d'un rouge brun assez vif, entouré de deux rangées écartées de poils rudes, rares et bifurqués. Le premier range touche les osselets, le seconde avoisine le bord du manteau, qui est lui-même villeux, jaunâtre en dessous, ainsi que le pied. Les franges céphaliques, au lieu de s'étaler, se resserrent en long sur les côtes de la bouche. Les branchies arrivent à les toucher. Il y a de chaque côté, trente-trois folioles, et de plus, en avant, une douzaine d'autres lamelles plus petites. Les valves sont très-transverses, peu élevées, à arc surbaissé, sans carène, un peu cordiformes et striées sur leur limbe en avant, blanches ou verdâtres, avec un cercle rouge brun. La première a neuf dents sur le bord, et la dernière n'en présente aucune. Les apophyses d'insertion sont peu larges, et ne sont séparées que part une échancrure très-obtuse. Elles sont entaillées, comme à l'ordinaire, sur le côté. A l'exception du dernier, tous ces osselets décroissent peu. En dessous ils sont d'un blanc mat. Leur forme extérieure était légèrement altérée en arrière dans les deux individus que nous possédons: mais la couleur rouge de cette espèce et ses deux rangées d'aiguillons binaires la feront facilement distinguer. Elle provient de la Nouvelle-Zélande, et à été prise dans la Passe des Français de la baie Tasman. Dimensions: Longueur, 22 lignes. Largeur environ, 15 lignes."

When Hutton wrote his first memorable account of the Loricates of New Zealand, an account well ahead of those of his contemporaries elsewhere, he introduced:—

"*Tonicia corticata.* Oval; margin naked; valves much depressed; posterior margins slightly concave; lateral areas bounded on either side by a flatly nodulose ridge, the space between being obliquely striated, the striae running outward and backward; median areas rugose, without either distinct lines or granules. Length, 1.25 inch; breadth, 1.13 inch. Colour: Margin black when dry; valves grey; inside white, covered over with white coralline growth, and small marine algae.

"Founded on a specimen in the Colonial Museum; locality not stated."

At the same place Hutton described *Acanthopleura complexa*: "Oval; margin broad, velvety, with long spines scattered over it; valves depressed, flattened on each side, subcarinate; posterior margins not covering the next at the corners, rather convex, and pointed in the centre; anterior valve with radiating moniliform ridges; lateral areas of intermediate plates granulose, with two prominent, radiating, slightly curved ridges on each side; median areas with finely granular transverse waved lines, which pass imperceptibly into the larger lateral granulations; posterior valve small, like the intermediate ones; centre of valves punctate internally. Length, 1 inch; breadth, .5 inch.

"Colour: Margin reddish brown, varied with darker; valves greyish, more or less varied with yellowish-white, yellow, or brown.

"From the collection of the late Mr. W. Swainson; locality not stated."

Specimens had been collected by the early workers in New Zealand as Captains Bolton and Stokes, and when Carpenter worked at these in the British Museum he determined them as a new species, which he called *Streptochiton cupreus*, but later he regarded them as *caelata* Reeve, and led Smith into the error of describing *Chiton terminalis*.

Hutton, in New Zealand, had identified the species from the French voyages, though the British workers did not do so. Consequently, the species became well known to Neozelanic workers, who, however, on the mainland, appear to have confused *aurata* with it.

xvi. Genus VAFERICHITON, *nov.*

Type *Plaxiphora murdochi* Suter.

The very fine close sculpture and appearance of this shell, together with the remarkable girdle covering, demand a distinctive name. While it shows general Plaxiphorid features in having the anterior valve eight-slit, the median one-slit and the posterior valve with a callus only, the girdle has sutural pores, but is covered with *minute triangular scales, some grooved, some plain*. There are no true corneous processes present, but a few scattered hairs may be detected.

45. VAFERICHITON MURDOCHI.

(Plate vii., figs. 13, 14.)

1905. *Plaxiphora (s.str.) murdochi* Suter, Journ. Malac., xii., 67, pl. ix., fig. 11. December 30. Kawhia Harbour, North Island, N.Z. Type in Coll. Suter, now in Wanganui Museum, New Zealand.

1913. *Plaxiphora murdochi* Suter, Man. N.Z. Moll., 20. Atlas, pl. 3, fig. 16.

1915. *Plaxiphora murdochi* Iredale, Trans. N.Z. Inst., 47, 1914, 424.

This species was well described by Suter from a locality little visited, viz., Kawhia Harbour, west coast of North Island, New Zealand, and, of course, is little known, as collections have not since been made from that locality as far as we are aware.

Among a collection of Loricates made by C. R. Laws at Tomahawk, on the south coast of the Otago Peninsula, in the South Island, was a remarkably well preserved shell, which recalled no species autoptically known to us. We had a beautiful drawing made, and then a familiarity developed which led us to the figure provided by Murdoch and published by Suter.

Suter's description of his *Plaxiphora (s.str.) murdochi* reads: "Shell rather small, oval, slightly narrowed behind, roundly angled along the top of the valves, blackish-green, finely sculptured, intermediate valves mucronated, girdle rather narrow; of a minutely scaly appearance and with sparse hairlets. Anterior valve radiately eight ribbed, with five diverging striae, which are coarser near the anterior margin, and from (*sic*) elongated nodules on the posterior edges. Intermediate valves with a lighter coloured posterior mucro, the whole surface sculptured with fine striae; the lateral areas are distinctly marked off by an elevated ridge descending from the jugum and dissolving into numerous fine striae near the margins, the striae on the lateral areas and the pleural tracts are arranged in such a way that they radiate from the ridge like the webs from the shaft of a feather. The posterior margin has a row of nodules on each side, like the anterior valve. Central area with diverging riblets in front of the mucro, but straight and parallel to the jugum on the remaining surface. Posterior valve small, very slightly emarginate behind; mucro terminal, slightly raised, from the elevated postero-lateral ribs; the fine riblets diverge straight in front, obliquely on the posterior side. Girdle has, viewed with an ordinary pocket lens, the appearance of being minutely scaly, but a more powerful lens reveals the fact that the whole girdle is densely and regularly pitted. Near some of the sutures I found tufts of a few light coloured bristles, and a few hairlets were found near the margin of the girdle, but it was not easy to find them. It seems most likely that the whole girdle was originally densely covered with fine, short hairlets, and tufts near all the sutures, but that they are very easily rubbed off. Colour blackish-green, girdle a little darker. The anterior valve has a few concentric zigzag bands of light blue; the intermediate valves have a number of wavy, longitudinal blue streaks, running over the lateral and pleural tracts; the posterior valve has only an indistinct blue patch on each side. Interior blue, the sutural laminae white. Sinus rather narrow, straight; the sutural laminae broadly arched, short. Anterior valve with eight slits, corresponding to the external ribs: teeth strong, broadly grooved on the outside; intermediate valves with one slit on each side, corresponding with the ribs of the lateral areas; posterior valve with a smooth insertion-plate, with a posterior median sinus, no slits. Length, 17; breadth, 13 mm.; divergence, 108°. Habitat: Near entrance to Kawhia Harbour; on rocks at half tide. Much exposed to very heavy seas. With regard to the sculpture this species stands nearest to *P. biramosa* and *caelata,* but in both of these it is much coarser. The beautiful fine sculpture, colour, and the curiously pitted girdle, when devoid of hairs, separate it at once from the two."

Judging from the densely packed scales on the girdle of the example collected by Laws, it would appear that Suter's type had been stripped of its scales—hence the "curiously pitted girdle."

Laws's specimen was collected on rocks at half tide.

xvii. Genus GUILDINGIA.

1893. *Guildingia* Pilsbry, Man. Conch., xiv., 329. ex Carpenter MS. Type by original designation *Plaxiphora obtecta* Pilsbry.

1878. *Guildingia* Dall, Proc. U.S. Nat. Mus. (Sci. Res. Expl. Alaska), 332, ex Cpr. M.S. *Nomen nudum.*

1881. *Guildingia* Dall, Proc. U.S. Nat. Mus., 284, 288. *Nomen nudum.*

This very beautiful monotypic genus is so unlike the rest of the Plaxiphorids as to suggest another location, but further research is necessary to determine this.

Shell large, oval, smooth and glossy; girdle very large, fleshy and thickly beset with long corneous processes. The teeth are very long in the anterior and median valves, the sutural laminae long, a deep sinus between, in the posterior valve, which has the mucro of the tegmentum terminal. The complete lack of sculpture, save for growth lines, combined with the comparative narrowness of the valves and the great width of the girdle sufficiently characterise this genus.

The genus name was proposed by Carpenter, but never characterised, and Dall twice mentioned it without validating it, so that the name was still a *nomen indet.* until Pilsbry defined it. Nevertheless, an apparent contradiction must be explained.

Tryon in his Struct. and Syst. Conch., Vol. ii., 1883, 345, wrote:—

"*Euplaciphora,* Shutt. Sinus wide, planate; girdle set with bristles, not fasciculated.

"*Guildingia.* Cpr. Valves partly immersed; girdle emarginate behind. *C. petholatus,* Sowb. (lxxxvi., 89)."

Reference to the plate shows a figure of *"petholatus,"* agreeing with the diagnosis of *Euplaciphora.* not of *Guildingia,* and in the explanation of plates, p. 427, appears:—

"Pl. 86, fig. 89. *Chiton* (*Euplaciphora*) *petholatus* Sowb. Australia. Page 345."

This proves that the citation of *petholatus* under *Guildingia* was merely a printer's error, and that it should have been placed after *Euplaciphora.*

46. GUILDINGIA OBTECTA.

(Plate vii., figs. 17-23.)

1893. *Plaxiphora obtecta* Pilsbry, Man. Conch., Ser. 1, xiv., 330 (June). ex Carpenter MS. New Zealand. Type in Mus. Cuming in British Museum.
1894. *Plaxiphora suteri* Pilsbry, Nautilus, viii., 8. Timaru, Sumner and Port Lyttelton, N.Z. Type in Philadelphia Acad. Nat. Sciences.
1897. *Plaxiphora suteri* Suter, Proc. Mal. Soc., ii., 190.
1897. *Plaxiphora* (*Guildingia*) *obtecta* Suter, Proc. Mal. Soc., ii., 192.
1904. *Plaxiphora suteri* Hutton, Index Faunae N.Z., 87.
1904. *Plaxiphora obtecta* Hutton, Index Faunae N.Z., 87.
1904. *Plaxiphora glauca* Wissel, Zool. Jahrb. Abt. Syst., 20, 606. Erroneous identification only.
1905. *Plaxiphora suteri* Hamilton, Col. Mus. Bull. No. 1, 41.
1905. *Plaxiphora suteri* Nierstrasz, Notes Leyden Mus., xxv., 149.
1909. *Plaxiphora glauca* Suter, Nachr. Blatt. Deutsch. Mal. Gesell., 74. Correction of Wissel's error.
1909. *Plaxiphora obtecta* Suter, Nachr. Blatt. Deutsch. Mal. Gesell., 74. (= *suteri* Pilsbry).
1910. *Plaxiphora obtecta* Iredale, Proc. Mal. Soc., ix., 92. July.
1913. *Plaxiphora obtecta* Suter, Man. N.Z. Moll., 23, 1077, 1079. Atlas, pl. 2, fig. 7; pl. 32, fig. 10.
1915. *Guildingia obtecta* Iredale, Trans. N.Z. Inst., 47, 1914, 425.

Pilsbry published as *Plaxiphora obtecta* a description of a specimen in the British Museum which Carpenter had regarded as a distinct genus *Guildingia.* The description reads: "Shell large, broad, partly covered. Valves smooth, most minutely punctulate angulate in front; sutural sinus large, produced forward over the jugum; lateral areas scarcely defined, except by an angle at the forward outer margin of the valves; dorsal ridge rounded. Intense olivaceous, paler on the dorsal ridge. Mucro of posterior valve terminal hardly produced. Interior; posterior valve with flattened insertion-plates. Anterior valve with eight; central valves one-slit; teeth very acute, long, smooth, a little thickened at the slit-edges; eaves narrow, spongy. Sinus deep, very obtusely angular, with a spongy area. Sutural laminae long, separated. Girdle very broad, sinuated behind, with bundles of about three large, horn-like hairs at the sutures and having smaller ones sparsely scattered all over more or less closely (Cpr.). Length, 50;

breadth, 32 mm.; divergence, 120 mm. New Zealand (Mus. Cum., No. 45). This very interesting shell differs from the typical *Plaxiphorae* as *Fannettia* does from *Tonicia*. It is, however, simply an exaggeration of *P. terminalis*."

Lack of illustration apparently led to this erroneous conclusion by Pilsbry, so that almost immediately he described (from specimens) *Plaxiphora suteri* thus: "Shell resembling *P. biramosa* Q. and *P. superba* Cpr.; but girdle all over sparcely (*sic*) hairy, *without the least indication of pores or sutural bristles*. Valves smooth, with slight growth-wrinkles, the diagonal rib but slightly indicated. Ridge with a chestnut band with a stripe of green on each side of it, the pleura and lateral areas uniform blackish olive. Girdle blackish with chestnut hairs. Interior blue, fading to white on the sutural-plates. Length, about 45; breadth, about 25 mm. (specimens all curled and contracted) Timaru, Sumner and Port Lyttelton, S. Island, N.Z. (H. Suter). A young specimen has the earlier formed portion of each valve light brown, spotted with white. This is probably the normal colouring of the young shells."

Dimensions: Up to 90 x 60 mm.

This fine shell lives commonly on the rocks at low water among kelp roots, and Iredale co-ordinated the two descriptions, but Suter at first demurred. Later, Iredale examined the type of *obtecta*, and Suter agreed to the identity, which cannot be questioned.

xviii. Genus FREMBLEYA.

1866. *Frembleya* H. Adams, P.Z.S., 445. Type by monotypy *F. egregia* H. Adams.

1878. *Streptochiton* Dall, P.U.S. Nat. Mus., 1878, 332, as synonym of *Fremblyia* (sic).

The original diagnosis reads: "Testa ovalis, convexa. Valvae transversae, latae, carinatae; apex posterioris; valvae terminalis, producta, fissa. Limbus angustus, postice fissus, setis corneis, dense obsitus.

"The covering of the mantle, the form of the visible portions of the valves, and the peculiarity of the terminal valve, render this species distinct from any form of CHITONIDAE yet described. It has the appearance of a *Lorica*, with the mantle covered with long bristles, instead of imbricate scales."

This is another of the remarkable Neozelanic forms classed in the PLAXIPHORIDAE for want of a better location. It is practically certain that later research will remove this genus elsewhere.

Shell elongate, oval to broadly ovate, heavily sculptured; girdle comparatively narrow, sutural tufts prominent, similar tufts in front of the anterior valve probably eight in number, while three or four may be found behind the posterior valve where the girdle is sinuate. The valves are very wide and somewhat shallow; the sutural laminae wide and the teeth short. In the anterior valve the slits are eight in number, the teeth grooved, the edges fluted; in the posterior valve the plate is reduced to a callus beyond which the mucro of the tegmentum projects. This mucro is upturned, and a receding slope can be distinguished behind.

This species (for the genus is at present monotypic) lives inside kelp roots at low tide, and when alive the animal is very fleshy; the gills are distant, though extending the length of the foot.

47. Frembleya egregia.

(Plate viii., figs. 1-8.)

1866. *Frembleya cgregia* H. Adams, P.Z.S., 1861, 445, pl. xxxviii., fig. 9. Hab. ?. = New Zealand. Type in British Museum.
1872. *Acanthochaetes ovatus* Hutton, Trans. New Zeal. Inst., iv., 1871, 182. Hab.: New Zealand. Type in Dominion Museum, Wellington, N.Z.
1873. *Acanthochaetes ovatus* Hutton, Cat. Marine Moll. N.Z., 50.
1880. *Acanthochites ovatus* Hutton, Man. N.Z. Moll., 117.
1893. *Plaxiphora egregia* Pilsbry, Man. Conch., xiv., 331, pl. 65, figs. 80, 81, 82.
1893. *Streptochiton tortuosus* Pilsbry, Man. Conch., xiv., 331, ex Carpenter MS. in synonymy.
1893. *Plaxiphora ovata* Pilsbry, Man. Conch., xiv., 332, pl. 54, figs. 34-40.
1897. *Plaxiphora (Fremblya) ovata* Suter, Proc. Mal. Soc., ii., 192.
1904. *Plaxiphora ovata* Hutton, Index Faunae N.Z., 87.
1905. *Plaxiphora ovata* Hamilton, Col. Mus. Bull. No. 1, 36.
1908. *Plaxiphora ovata* Iredale, Trans. N.Z. Inst., xl., 1907, 375; pl. xxxi., fig. 1 (six-valved aberration).
1909. *Frembleya ovata* Thiele, Revision Chitonen, pt. i. (Chun's Zoologica, heft. 56), 29, pl. iii., figs. 50-2.
1910. *Plaxiphora egregia* Iredale, Proc. Mal. Soc., ix., 92.
1913. *Plaxiphora ovata* Suter, Man. N.Z. Moll., 24. Atlas, pl. 2, fig. 8; pl. 3, fig. 15.
1913. *Plaxiphora egregia* Suter, Man. N.Z. Moll., 1079.
1915. *Plaxiphora egregia* Iredale, Trans. N.Z. Inst., 47, 1914, 424.
1926. *Plaxiphora ovata* Mestayer, Trans. N.Z. Inst., 56, 585, pl. 100, figs. 7-8 (type figured).

H. Adams's description of the species reads: "Shell ovate, a little narrower in front, green-brown, paler at the sides. Anterior valve radially ribbed, the ribs pustulose, interstices obliquely lirate; posterior valve and median valves subcarinate, the dorsal areas densely longitudinally lirate; lateral areas radially ribbed, the ribs pustulose. Girdle moderate, furnished with short, corneous spicules.

"Habitat unknown."

A few years later Hutton described *Acanthochaetes ovatus*: "Ovate, attenuated in front; margin spiny, with nine small bundles along each side; valves flatly triangular, sub-carinate, posterior valve very narrow, apex re-curved;posterior margins of the anterior plate sloping backwards into a point, those of the posterior plates nearly straight, anterior valve with ten, and lateral areas with two on each side, radiating nodulose ridges; median areas with slightly waved longitudinal ridges; dorsal line smooth. Length, .6 inch; breadth, .5 inch.

"Colour: Mantle pale reddish brown; spines white; valves greenish white; yellowish on the dorsal line. Several specimens in the Colonial Museum; locality not stated."

Pilsbry published Carpenter's MS. description of the type of *egregia* and associated *ovata* in the same group, but did not accept their identity. The description reads: "Shell olivaceous, maculated with more or less intense; ovate, broad, elevated; dorsal ridge rather acute, much elevated, the side slopes straight. Valves strongly beaked, each one eroded in front from the attrition of the next valve forward. The central areas have about 16 lirae on each side, about equalling the interspaces in width.

Lateral areas elevated, bicostate, the ribs strongly granose, granules larger at the sutures, intermediate space obliquely costate or V-costate. Anterior valve having 10 radiating ribs, the interstices sculptured with V-shaped sulci, the V's meeting over the ribs and rendering them somewhat nodulous. Posterior valve with posterior elevated mucro and a single posterior rib on each side; posterior area very narrow and smooth. The girdle has soft hairs, and a few larger, and there is some trace of pores. The posterior slit in the girdle mentioned by Adams seems to be an accidental tear; H. Adams believes the same Length, 15; breadth, 10 mm.; divergence, 133°."

As the habitat was unknown, Pilsbry added: "Newcastle, Australia (Dieffenbach, teste Cpr.)," and through this erroneous locality the two species were kept separate. Dieffenbach collected in New Zealand, and a mistake in locality was made, as the form is restricted to New Zealand. Recently, Miss Mestayer has figured the type of *ovata* Hutton and advocated two species, but the variation observed is purely individual.

Station: Up to the present only found under kelp roots at low tide.

Dimensions: Up to 20 x 14 mm.

xix. Genus HEMIARTHRUM.

1876. *Hemiarthrum* Dall, Bull. U.S. Nat. Mus., iii., 44. February. ex Carpenter MS. Type by monotypy *H. setulosum* Dall.

At the place cited Dall published Carpenter's MS. account without comment. In that description Carpenter concluded that it formed a transition between *Hanleya* and the articulate chitons through the value of the insertion-plates. Haddon did not add anything of value in his account of the Kerguelen species, consequently Pilsbry allowed the species the same location, i.e., in the LEPIDOPLEURIDAE.

Obviously it had no real relation with the majority of the species, and examination of specimens collected at Macquarie Island suggested their reference here. We wrote (this Journal iii., 339, 1925) that "*Hemiarthrum* proves to be a *Plaxiphora,* with the anterior and median valves showing unslit insertion-plates and degenerate external sculpture."

Finlay printed Iredale's note (Trans. N.Z. Inst., 57, 1927, 333): "*Hemiarthrum* may be a degenerate Plaxiphorid, the unslit head plate being faintly striated, the sutural laminae of the median valves being more like those of *Plaxiphora s.l.* than of *Acanthochiton s.l.*, while the little unslit projecting tail plate is like that of a young Plaxiphorid, and not at all Acanthochitonoid. Further, the sculpture agrees better with that of the former, and, curiously enough, while Carpenter noted only four tufts around the head valve—the correct number for an *Acanthochiton*—Haddon pointed out that the specimen he examined had six, while the specimens in the Australian Museum prove to have eight, which pretty definitely determines the relationship."

Shell small, elongate, valves weakly sculptured; girdle leathery, with short corneous processes scattered all over, and bunches of longer processes at sutural pores, and also eight in front of anterior valve and two behind the posterior valve.

Internally, the anterior valve shows a weakly striated insertion-plate, with vestiges of slits indicating its degenerate nature; median valves with sutural laminae fairly widely separated and extending at sides without any slit. Posterior valve with sutural laminae of the typical Plaxiphorid form, and a sinuate callus of similar design, the tegmentum exceeding it. These characters are very different from any of the true Lepidopleurids or Acanthochitonoids.

48. Hemiarthrum hamiltonorum, *sp. nov.*

(Plate viii., figs. 9-15.)

1916. *Hemiarthrum setulosum* Hedley, Austr. Antarctic Exped., 1911-1914, Sci. Rep. Ser. C. Zool., Vol. iv., 34. Macquarie I.
1926. *Hemiarthrum setulosum* Finlay, Trans. N.Z. Inst., 57, 332.
[Not *Hemiarthrum setulosum* Dall, Bull. U.S. Nat. Mus., iii., 44 (February), ex Cpr. MS. Kerguelen I.]

Finlay published Iredale's note: "The Macquarie Island shells appear to be a little different, the sculpture being finer and the mucro of the posterior valve nearly median and a little elevated, while in the extralimital shell the mucro is elevated and terminal."

The generic description covers this species, and the detail figures show all the points emphasised, the mucro, however, being shown more posterior than usual. The species is named for the two Hamiltons, father and son, who both collected on the Subantarctic Islands.

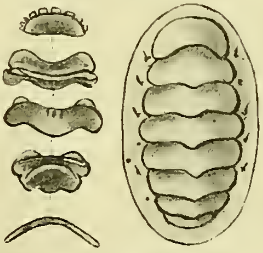
Dimensions: 10 x 5 mm.

Station: On rocks washed by the sea at low water.

[49. Mopalia australis.

1907. *Mopalia australis* Suter, Proc. Mal. Soc., vii., 215, pl. xviii., fig. 12a. Snares I., New Zealand. Type in Coll. Suter now in the Wanganui Museum.
1909. *Mopalia australis* Suter, Subant. Islands of N.Z., i., 2.
1913. *Mopalia australis* Suter, Man. N.Z. Moll., 16. Atlas, pl. 3, figs. 12, 12a.
1915. *Acanthochiton australis* Iredale, Trans. N.Z. Inst., 47, 1914, 420, 425.
1926. *Mopalia australis* Ashby, Proc. Mal. Soc., xvii., 32 (nothing).

Suter described a curious little shell thus: "Shell very small, elongately oval, with a blackish leathery girdle and sutural tufts. Anterior valve with eight slits, teeth smooth. Intermediate valves with a rounded central posterior projection; insertion-plates with one slit. Posterior valve depressed, with an oblique slit on each side, and bisinuate in the middle behind. Girdle narrow, leathery, slightly broader on the sides, with a few sutural spicules. Colour probably ash-grey, with a few longitudinal brown stripes on the jugum; inside bluish grey with a posterior brown margin. On the intermediate valves the tegmentum forms a narrow band by passing beyond the articulamentum. Sinus broad and slightly pectinate, the sutural plates narrowly rounded. The valve callus is quite distinct. Length, 9; breadth, 5.5 mm.; divergence, 120°. Habitat: I am indebted to Captain J. Bollons for two specimens he collected at the Snares Islands (south of Stewart Island). Both examples are so much corroded that it is impossible to recognise the sculpture. The side slits of the posterior valve leave no doubt about its generic position."



Copy of Suter's figures of *Mopalia australis.*

Iredale suggested that this might be an *Acanthochiton,* as the posterior valve is two slit and somewhat sinuate behind, while the eight slits might have been due to interslitting. Ashby's remarks are entirely valueless, thus: "The few setae mentioned by Suter as occurring on the girdle are probably mopalioid" is entirely imaginary, as Suter's description copied above shows. At present it cannot be exactly determined.]

VIII. Family CHITONIDAE.

All the most specialised forms of Loricates with scaly girdles and pectinate teeth have been classed, together with similar forms without girdle scales, in the family CHITONIDAE, which is undoubtedly composed of diverse elements.

In Neozelanic waters there are three very distinct series with scaly girdles, the *Tegulaplax-Rhyssoplax-Mucrosquama* series, the *Sypharochiton* series, and the *Amaurochiton* series, and one with a leathery girdle, *Onithochiton.*

As these series have geographic ranges of distinct evolution, it will be as well to name the series as subfamilies at once and place them on a systematic basis.

The subfamily *Rhyssoplacinae* comprises species ranging from the Mediterranean Sea, through the Red Sea, Indian Ocean, Australia, and New Zealand to the Pacific Ocean. Curiously enough, the majority of species live in southern Australia and New Zealand, where they also grow to their largest size. They have a very characteristic external appearance, shape, sculpture and girdle scaling, and internally they are just as well-marked, the insertion-plates being long, regular, well cut, teeth and sinus finely denticulate. The slitting in the anterior valve is eight, the median valves one-slit on each side, the posterior valve 10-12 slit, mucro submedian. There is so little variation in this respect that no features of value can be utilised for separative purposes. The scales vary a little in size and striation. They generally live below half tide to below low water, but none have yet been dredged from any depth. All are fairly active; the genus *Tegulaplax* is very active, while the *Mucrosquama* (an Australian genus) series tend to become sedentary at an early stage. Only two genera occur in this region: *Tegulaplax,* with concentric sculpture on the anterior valve and lateral areas of the median valves, restricted to Lord Howe Island at present, and *Rhyssoplax,* with the lateral areas and anterior valve radiately ribbed; in Australia a section of *Rhyssoplax* has the anterior valve and lateral areas smooth, a phase passed through in youth by the Neozelanic shells.

The subfamily *Amaurochitoninae* contains two species—one in South America, the other in New Zealand; it only occurs in Australia as an established introduced shell. The curious sculpture and extraordinary girdle scales indicate this subfamily at sight.

The subfamily *Sypharochitoninae* includes species of heavy build, coarse external sculpture (though sometimes obsolete) and large separate scales. Internally, the teething of the insertion-plates is very unlike that of the other subfamilies, being rough and brittle.

The genus *Onithochiton* is notable for very pronounced "eyes," and consequently anomalous when contrasted with the preceding, as the wide girdle is not scaly, but minutely spiculose, and while the insertion-plates and slits recall those of the *Rhyssoplacinae,* the posterior valve has lost its insertion-plate, a callus being present. One species is very common in New Zealand and a close relative lives at the Kermadecs, but the Lord Howe Island species is like the Australian one, which does not range far south of Sydney, but goes into Queensland, where it becomes associated with

Lucilina, a genus only separable by the fact that the posterior valve has a large elevated mucro and strong well toothed insertion-plate. Resembling these, the genus *Tonicia* occurs in South America, where no *Onithochiton* has yet been found. In view of the discontinuous range, it will be best to call the Austral-Neozelanic subfamiy, the *Onithochitoninae*. It may be noted that the genus *Lucilina* occurs in small forms at the Kermadecs and Lord Howe Islands, but valves have as yet only been recovered from dredgings.

xx. Genus TEGULAPLAX.

1926. *Tegulaplax* Iredale & Hull, Aust. Zool., iv., 171. Type by original designation, *Chiton howensis* Hedley & Hull.

The original account is here repeated as we have nothing yet to add: "This curious genus recalls *Rhyssoplax*, but the animal is alert and active like that of *Ischnochiton* (*sensu lato*). The elongate shape with the narrow elevated shell and very broad girdle and characteristic sculpture present features easily recognised. It would appear to be an early offshoot from the ancestral *Rhyssoplacid* stock. which developed a curious sculpture, and has retained it without modification for a long period."

The known distribution of the genus at present is Red Sea, Maldive and Laccadive Archipelagoes, Ceylon, Moluccas, Torres Strait and Lord Howe Island.

50. TEGULAPLAX HOWENSIS.

(Plate viii., figs. 17-24.)

1912. *Chiton howensis* Hedley & Hull, Proc. Linn. Soc. N.S.W., xxxvii., 278, pl. xiii., figs. 7a-g. Lord Howe Island. Type in Australian Museum, Sydney.

This beautiful shell was thus described: "Shell strongly elevated. carinated, side slopes curved and steep. Colour very variable, creamy white, maculated with pink, purple or brown, chiefly on the end valves and lateral areas; central areas green, jugal tract paler, the whole shell finely mottled in colour. Anterior valve with 8-10 somewhat irregular wavy concentric riblets. Posterior valve; mucro prominent, in front of the centre, posterior slope convex, concentrically ribbed similarly to the anterior valve, but with slight radial depressions. Median valves strongly raised, deeply transversely ribbed with irregular wavy riblets which are traversed by a shallow depression. Central areas smooth; jugal tract finely transversely striate. Girdle irregularly tesselated with broad bands of purple brown, with scattered deep green scales. Scales small, densely imbricating, striate, polished on the margins. Interior bluish white; sinus broad, denticulate. Anterior valve having 10, median valves 1-1, and posterior valve 12 slits. Teeth very finely pectinate on the edge. Length, 18 mm.; breadth, 9 mm. Station: On the underside or at the edge of insertion in the sand of small smooth stones, in sheltered pools, at low tide. Habitat: Lord Howe Island. Remarks: It is not closely allied to any other Australasian chiton."

xxi. Genus RHYSSOPLAX.

1893. *Rhyssoplax* Thiele, Das Gebiss der Schnecken (Troschel), ii., 368. Type by monotypy *Rhyssoplax janeirensis* Thiele = *Chiton affinis* Issel.

1893. *Clathropleura* Thiele, Das Gebiss der Schnecken (Troschel), ii., 367. Not *Clathropleura* Tiberi, 1877 (Cf. Iredale, Proc. Mal. Soc., xi., 40, 1914).

1893. *Anthochiton* Thiele, Das Gebiss der Schnecken (Troschel), ii., 377. Type by monotypy *Chiton tulipa* Quoy & Gaimard.

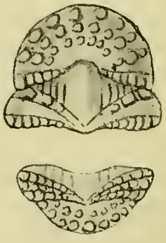
Medium sized Loricates with scaly girdles, anterior valve with eight slits, median with one slit at each side, posterior valve with about ten slits, all teeth finely denticulate; sutural laminae large, sinus narrow and denticulate. External sculpture generally of radials, more or less nodulose, ribs on anterior valves, median lateral areas and postmucronal area; pleural areas generally longitudinally grooved; the juveniles are smooth and some forms exist in which radials are not developed. Girdle scales oval, striate.

The species live below median tide and are comparatively restricted in distribution, so that many species have developed. The Neozelanic Region may yet receive notable additions, as some half dozen distinct species are now known. Their separative features may be tabulated thus:—

Anterior valve with few rounded nodulose rays.
pleural areas with few ridges .. .. *clavata.*
with many nodulose ribs and many ridges on pleural areas .. *huttoni.*
Anterior valve with ribs nearly smooth.
few ridges crossing the pleura .. .. *suteri.*
few ridges not crossing the pleura .. .. *aerea.*
many ridges not crossing the pleura .. .. *exasperata.*
scales larger, sulci stronger .. .. *coryphea.*
many ridges crossing the pleura .. .. *canaliculata.*
Anterior valve with ribs cut into lozenges.
many ridges crossing the pleura .. .. *stangeri.*
[few ridges, most crossing the pleura .. .. *whitleyi.*]

51. RHYSSOPLAX CLAVATA.

1907. *Chiton clavatus* Suter, Proc. Mal. Soc., vii., 296, fig. 3 in text. Near Auckland, N.Z. Type in Coll. Suter, now in Wanganui Museum, N.Z.
1913. *Chiton clavatus* Suter, Man. N.Z. Moll., 38. Atlas, pl. 4, fig. 11.
1915. *Rhyssoplax clavata* Iredale, Trans. N.Z. Inst., 47, 1914, 426.


Copy of Suter's figure of *Rhyssoplax clavata*

Little is known of this species save Suter's description: "Shell small, elongated oval, acutely raised, surface of all valves minutely shagreened, with nodulous sculpture, colour grey, some valves brown. Anterior valve with eight radiate ribs, each consisting of three flatly convex nodules, the uppermost small and round, the following large and squarish, the lowest a little smaller and oblong; posterior margin crenulate. Intermediate valves have the first longer than the others, sharply angled, and slightly beaked; central areas with five to six deep longitudinal furrows on each side; lateral areas raised, with an anterior and posterior broad rib bearing flatly raised, squarish nodules, which are more numerous on the posterior rib; seventh valve having a few central nodules on the lateral areas marking a third rib; sutures strongly and bluntly crenulated. Posterior valve with two concentric rows of round nodules, representing 10 radiate ribs; mucro slightly in front of the middle, small and pointed, posterior slope straight. Girdle with rather large imbricating, convex, and smooth scales, smaller on the inner side. Colour of valves 1, 2, 7, 8 ash-grey, the other valves greyish brown with white spots along the ridge; girdle uniformly grey. Interior; anterior valve with eight, intermediate valves with one, and posterior valve with 11 slits; teeth pectinate. Length, 14; breadth, 9 mm.; divergence, 95°. Habitat: Rangitoto Island, near Auckland, between tide marks (H.S.). Of the New Zealand species, *C. limans* Sykes, is the nearest, from which, however, it is easily separated by the smooth, not sharply raised tubercles, and the rounded, not pointed, and smooth scales. Only one specimen was found."

52. RHYSSOPLAX SUTERI.

(Plate viii., figs. 28, 29.)

1910. *Chiton suteri* Iredale, Proc. Malac. Soc., ix., 102. June. New name for *Chiton stangeri* Suter, 1897, not Reeve. Lyttelton Harbour, N.Z.
1897. *Chiton stangeri* Suter, Proc. Mal. Soc., ii., 196. July.
1904. *Chiton stangeri* Hutton, Index Faunae N.Z., 86.
1913. *Chiton stangeri* Suter, Man. N.Z. Moll., 40.
1913. *Chiton suteri* Suter, Man. N.Z. Moll., 1081. Atlas, pl. 2, fig. 19; pl. 4, fig. 13.
1914. *Chiton suteri* Iredale, Proc. Mal. Soc., xi., 43. March.
1915. *Rhyssoplax suteri* Iredale, Trans. N.Z. Inst., 47, 426, 1914.
[1924. *Rhyssoplax suteri* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd, 77 (N.Z. Moll.), 9.]

Suter recorded as *Chiton stangeri* a species thus: "In size, shape, coloration, and sculpture very much like *Chiton limans*, but differing in the following points:—The ribs have no *acute, elevated* grains, but are flattened. The tail valve has very distinct, flatly nodulous ribs. The jugum is less acute, divergence 120°. The imbricating scales of the girdle are very small on both margins, larger in the middle, *not mucronated,* and very faintly striated, the striae being visible only under strong magnifying power. Length, 13; breadth, 8 mm."

A complete description was published in the Manual: "Shell small, ovate-oblong, elevated, sculpture rather coarse, whitish with green. Anterior valve with about 20 radiate nodulous ribs, apex smooth, microscopically shagreened, sinuated. Intermediate valves sharply angled, side slopes straight; central areas with the jugum smooth and shining, minutely shagreened; sides with six to eight longitudinal grooves on each side, very narrow near the middle, broader towards the margins, ribs broad and smooth; lateral areas with three to four broad radiate ribs, cut up by regular growth-lines into squarish nodules. Posterior valve with about 20 nodulous riblets, central areas smooth, a few grooves on each side; mucro in front of the middle, pointed, posterior slope concave. Girdle with imbricating, rounded, and convex scales, largest in the median rows, microscopically faintly striated. Colour yellowish-white, tesselated with green and grey spots; girdle banded with light blue, green, and white. Interior greyish-blue; sinus narrow, denticulate; sutural laminae broadly rounded, white. Length, 13 mm.; breadth, 8 mm; divergence, 120°."

Iredale with W. R. Oliver collected two specimens, one at Taylor's Mistake, the other in Lyttelton Harbour, which were determined by Suter as his *C. stangeri*. Iredale later compared them with the type of *C. stangeri* Reeve, in the British Museum, and found them very distinct, Reeve's species being apparently *C. canaliculatus* Quoy & Gaimard. Iredale therefore renamed Suter's *C. stangeri* as above described, *C. suteri,* adding from his own shells: "The pleural areas are sculptured with six sulci, widely spaced and extending right across; the dorsal ridge quite smooth. The valves are beaked. The sulci of *suteri* are perfectly straight, and much fewer than in a *canaliculatus* of the same size.

53. RHYSSOPLAX AEREA.

(Plate viii., figs. 25-27.)

1847. *Chiton aereus* Reeve, Conch. Icon., iv., *Chiton,* pl. vii., sp. and fig. 36 February. New Zealand. Type in Museum Cuming, now in British Museum.
1873. *Chiton aereus* Hutton, Cat. Marine Moll. N.Z., 48.
1874. *Chiton (Leptochiton) aereus* Smith, Zool. Voy. Erebus Moll., 4, pl. i., fig. 9. Type figured.
1880. *Chiton aereus* Hutton, Man. N.Z. Moll., 112.
1891. *Chiton siculoides* E. A. Smith, P.Z.S., 392, ex Carpenter MS., as synonymy of *C. aereus.*
1893. *Chiton aereus* Pilsbry, Man. Conch., xiv., 179, pl. 36, figs. 96-97 (copy of Reeve only).
1893. *Chiton siculoides* Pilsbry, Man. Conch., xiv., 179, ex Carpenter MS. in synonymy.
1897. *Chiton aereus* Suter, Proc. Mal. Soc., ii., 195; synonymy only, not specimens.
1904. *Chiton aereus* Hutton, Index Faunae N.Z., 86.
1905. *Chiton aereus* Suter, Journ. Malac., xii., 70 (correction of 1897 error) record of N.Z. specimens.
1908 *Chiton aereus* Iredale, Trans. N.Z. Inst., xl., 1907, 376 (colour variation, etc.).
1909. *Chiton aereus* Suter, Subant. Islds. N.Z., Vol. i., 4. Auckland I.
1913. *Chiton aereus* Suter, Man. N.Z. Moll., 36. Atlas, pl. 2, fig. 15; pl. 4, fig. 9.
1914. *Chiton aereus* Iredale, Proc. Mal. Soc., xi., 40 (growth stages).
1915. *Rhyssoplax aerea* Iredale, Trans. N.Z. Inst., 47, 1914, 426.
1921. *Rhyssoplax oliveri* Mestayer, Trans. N.Z. Inst., liii., 1920, 179, pl. 38, figs. 9-11. Lyall Bay, N.Z.
1924. *Rhyssoplax aerea* Odhner, Vidensk. Medd. Dans K. Nat. Foren. Bd., 77 (N.Z. Moll.), 9. Auckland I.
1926. *Rhyssoplax oliveri* Finlay, Trans. N.Z. Inst., 59, 334 (is *aerea* juv.).

Reeve's description is very brief: "Shell oblong-ovate, angularly raised in the middle, valves rudely impressly striated throughout, umbonal eminence smooth; dull green; ligament granosely coriaceous. Habitat: New Zealand; Earl. Very characteristic in appearance, though simple in detail; the colour is an uniform dull green, except along the rubbed umbonal summit, where it has a copperas hue."

In 1893, Pilsbry doubted its Neozelanic habitat, but gave Carpenter's MS. notes on the type, as follows: "Central areas having about 20 furrows on each side, not deep, continuing until they are rubbed off in the middle; lateral areas having 4-8 divaricating riblets, much worn, broken up by the concentric rugae of growth; crenate at the sutures; end valves with about 30 riblets. Mucro in front of the middle, posterior slope concave. Interior bluish, sinus with 5-13 denticles, deep, narrow; girdle scales stout, roundish. Length, 39 mm.; breadth, 23 mm.; divergence, 94°."

Four years later Suter recorded its recognition from Manukau Harbour, and, though this was a mistaken identity, Murdoch soon after rediscovered it at Cape Egmont, Miss Mestayer at Lyall Bay, and Suter himself in the Hauraki Gulf.

Then Iredale and W. R. Oliver found it not uncommon in Lyttelton Harbour, and common at Shag Point, Otago, and all round the Otago Peninsula. Colour variations were recorded as follows: "The normal colouring is a bluish-green, sometimes with the girdle marked with white. Yellow-green occurs in some localities; pure lemon-yellow, yellowish-white, pure white, puce-coloured, and bright red-brown specimens are also rarely met with. In Otago, however, shells occur which I call albinos. So far I have obtained five distinct types. The general appearance of the shell is white; first, in which the whole is splashed with greenish-black; then, the valves are pure white, with the girdle blackish-brown; next, the shell is pure white with a greenish tinge, the girdle green and white; a fourth has the valves speckled with green and suffused with yellow, the girdle green and white; lastly, the valves suffused with greenish and the girdle pink."

Later, Iredale recorded: "I examined a series of *Chiton aereus* Reeve, and found that the most juvenile specimens were unsculptured, then the sulcations on the pleural areas appeared before the lateral radial ribbing was formed."

Notwithstanding this, Miss Mestayer has described *Rhyssoplax oliveri* thus: "Shell small, oval, smooth, with a subglossy surface, the side slopes almost straight. Anterior valve smooth except for six tiny nodules close to the girdle, and slight traces of radial riblets. The animal is dried inside, but the eight slits are easily seen under a pocket lens. Median valves slightly beaked, the jugal and pleural areas smooth, lateral areas raised, well defined, with very faint traces of radial sculpture. Interior one slit, sinus hidden by the animal, colour bluish, insertion-plates probably white. Posterior valve, mucro central, moderately prominent, posterior slope rather steeply concave, bounded by a nearly smooth rib. Interior eight slits. Colour: Ground-colour cream, mottled with dull green and small longitudinal flecks of light brown; the whole surface densely covered with microscopic white speckles. Girdle scales very finely closely striate, rounded, the largest along the centre, the outer edge with three or four rows of very fine outstanding spicules, which are easily rubbed off. Colour creamy transversely banded with green and tinged with brown. Measurements: Length, 10.5 mm.; breadth, 7 mm. Lyall Bay, Cook Strait, N.Z. Remarks: This species appears to be more closely related to *Rhyssoplax translucens* (H. & H.) of Australia, than any other New Zealand member of this genus. It differs from *R. translucens* in being smoother and much smaller, while the girdle scales are proportionately larger and rounder."

This was obviously the young stage of *R. aerea*, and Finlay very soon after recorded this fact. A figure of the type of *oliveri* is here given as an example of the growth stage.

This species appears to range throughout New Zealand from Auckland to Auckland Islands. There seems to be geographical variation, but not enough to separate the forms into species.

Dimensions: Up to 50 x 30 mm.

Station: Under stones below half tide, as in most other species of *Rhyssoplax*.

54. RHYSSOPLAX EXASPERATA.

(Plate ix., fig. 14.)

1914. *Rhyssoplax exasperata* Iredale, Proc. Mal. Soc., xi., 41, pl. ii., fig. 13. March. Sunday Island, Kermadec Group. Type in Canterbury Museum, Christchurch, New Zealand.

1915. *Rhyssoplax corypheus* subsp. *exasperata* Oliver, Trans. N.Z. Inst., xlvii., 1914, 558.

A long and complete account was furnished at the description of this species, as here transcribed: "Shell of medium size, broadly elongate oval, elevated, not definitely keeled, side slopes nearly straight, girdle scaly. Colour variable, green, splashed with lighter or darker, being the predominant tints; the green may be very pale or dark; white prevails in a few specimens, but no absolutely uniformly coloured shell was obtained, though practically a white one and a black-brown one were noted. Anterior valve rayed with twenty raised ribs, slightly nodulous; at the outer edge intercalating riblets occur in adult specimens. Median valves have their lateral areas similarly four or five ribbed; the pleural areas are sculptured with slanting very closely packed sulci, twelve or more in number, none of which reach the anterior edge of the valve, and vanish before the dorsal area is reached, thus leaving the jugal tract smooth and polished. Posterior valve has the mucro elevated, before the centre, the anterior portion sculptured as the pleural areas of the median valves, the posterior portion as the anterior valve, the ribs being fifteen or sixteen and more nodulous in character. Inside coloration greenish, but varying a little, according to the external coloration. Anterior valve has a slightly projecting insertion-plate regularly cut by eight slits, the teeth beautifully pectinated. Median valves with the insertion-plate one-slit, the sutural laminae low and broad, the sinus narrow and finely denticulate. Posterior plate less projecting than anterior, but more developed at side than centre; the slits number eleven, but one is disproportionate, whilst the others are fairly equal, thereby suggesting twelve to be the normal number. Girdle covered with small oval scales, very closely imbricating, and regularly finely grooved (the apices smooth).

"The above description is drawn up from a normal specimen selected as type. Some specimens are almost keeled, with fewer sulci, less slanting, on the pleural areas, whilst sometimes the anterior valve-raying lacks nodulosity altogether, and in other cases it is well pronounced. A very juvenile specimen, 5 mm. long, is smooth throughout, the surface minutely quincuncially granulose. It recalls *Chiton translucens*, Hedley and Hull. Specimens, 6.5 to 7 mm. long, are still smooth, but there now appear five or six sulci on the pleural areas. In some concentric growth lines can be observed. These suggest the *Ch. jugosus* Gould, group, especially *Ch. torrianus* Hedley and Hull. An older shell, though only 6 mm. long, shows the ribbing on the anterior valve to commence on the outside, fourteen being counted, which extend less than one-third the distance to the apex; the lateral areas are more strongly marked than in the preceding stage, a slight depression indicating the differentiation into ribbing; at the edge of the posterior valve nine nodules mark the beginning of the radial ribs; the pleural areas are sculptured, with six clean-cut sulci, which extend across the valve. Specimens, 10 mm. long, in some cases show little advancement on the previous stage, whilst in others they show almost perfectly developed adult sculpture. Length of type, 18; breadth, 10.5 mm. Habitat:

Sunday Island, Kermadec Group. Station: On the underside of clean, smooth stones below low tides. It is very close indeed to *Ch. corypheus* Hedley and Hull, but superficially the Kermadec shell has the ribbing on the anterior and posterior valves less nodulous, which is also the case with the lateral area sculpture of the median valves. Closer examination shows the scales on the girdle to be smaller in the Kermadec species, whilst the sulci on the pleural areas of the median valves are weaker. Internally, as was anticipated, little distinction can be seen, but the sinus in the Kermadec shells is noticeably narrower."

55. RHYSSOPLAX CORYPHEA.

(Plate ix., figs. 17-20.)

1912. *Chiton corypheus* Hedley and Hull, Proc. Linn. Soc. N.S.W., xxxvii., 277, pl. xii., figs. 6, 6a-c. Norfolk Island. Type in Australian Museum, Sydney.

The original description offered reads: "Shell elevated, carinated, side slopes convex, of medium size. Colour extremely variable, both in shade and pattern, yet two groups appear, one lighter and the other darker. The girdle is usually tesselated with light and dark. A line along the dorsal area is apt to be differentiated by being lighter or darker than the rest. Frequently the umbones are tipped with pink. Sometimes one or two valves oppose a sharp contrast to the rest. No monochromes appear; buff, olive-green, pink, and rarely white display an infinite variety of splashes or marbling. Anterior valve with 14-18 strongly raised granular riblets, increasing in size towards the margin; in mature examples the riblets are multiplied by splitting of the fewer radii of the younger shell. Posterior valve; mucro prominent, in front of the centre, with 14-16 radial riblets similar to anterior valve; central area similar to median valves. Median valves; lateral areas raised, with 2-4 prominent granular riblets, with shorter ones intercalating with age; central areas furrowed by 8-10 longitudinal sulci becoming obsolete anteriorly; jugal tract smooth and polished. Girdle unusually broad, scales finely transversely striate, polished at the margin. Interior green, becoming paler at the margin. Sinus narrow and deep. Anterior valve having 8, median 1-1, and posterior valve 10 slits. Length, 18 mm.; breadth, 10 mm. Station: On the under surface of loose stones in pools on the coral reef; on the under side of or in the interstices between large basalt boulders, or on the surface of the rock in 'potholes.' Habitat: Norfolk Island. Remarks: This shell appears to approach *C. discolor* Souverbie, of New Caledonia, but differs from that species in the fewer radial ribs on the end valves, and the fewer and less anteriorly prolonged sulci in the central areas. *Chiton canaliculatus* Quoy and Gaimard, from New Zealand, is also related, but is more elevated and sharper keeled and has a harsher sculpture."

[56. RHYSSOPLAX WHITLEYI, *sp. nov.*

(Plate ix., figs. 15, 16.)

Shell rather small, of medium elevation, side slopes a little curved, sculpture of nodulous radials on anterior valve, lateral areas of median valves and post-mucronal area, the pleural areas lightly sulcate, girdle scales striate. Coloration somewhat varied. The type and largest specimen has the anterior valve pale green, the posterior edges darker, as is the umbonal area; the second valve is creamy white; the third, fourth and fifth grading from pale green to blackish green; the sixth and seventh creamy again, and the eighth pale green; the girdle is pale green, banded with whitish. The others of the series vary from green to blackish green to creamy and pinkish white, more or less mottled or spotted with green, the girdle generally more or less strongly banded. Anterior valve with about twenty ribs, divaricating at the edges and the apex smooth; the ribs are cut into rather square nodules, or better composed of six or eight squarish nodules.

The lateral areas of the median valves are formed of three or four similar ribs, and the post-mucronal area shows fourteen, the nodules more distinct, yet the ribs divaricate.

The pleural areas have about ten slanting sulci crossing the valve, the jugal area smooth.

Posterior valve with mucro anti-median, a little elevated, posterior slope straight.

Girdle scales of medium size, beautifully striate.

Internal features normal.

Dimensions: 17 mm. x 10 mm. (type).

Station: Under stones at half tide.

Habitat: Rarotonga, Cook Island. Type in Australian Museum.

This interesting species was collected by Mr. G. P. Whitley, Ichthyologist at the Australian Museum, and is here named to appreciate his great interest, on our behalf, in this group on all his collecting and holiday trips. It is here introduced as Loricates are not common in the Pacific, and Rarotonga is under Neozelanic control. This was the only species found and appears to be related to the Norfolk Island *R. coryphea,* and the Kermadec Island *R. exasperata,* while the Huahine and Anaa *Chiton pacificus* Thiele (Rev. Chitonen (Chun Zool., heft 56), 93, pl. x., figs. 1-4, 1910) seems more distant.]

57. RHYSSOPLAX HUTTONI.

(Plate ix., figs. 8, 9.)

1906. *Chiton huttoni* Suter, Trans. New Zeal. Inst., 38, 1905, 320, pl. xviii., figs. 1-6. Near Dunedin, N.Z. Type in Coll. Suter, now in Wanganui Museum, N.Z.

1905. *Chiton huttoni* Suter, Journ. Malac., xii., 70. December 30. *nomen nudum.*

1913. *Chiton huttoni* Suter, Man. N.Z. Moll., 38. Atlas, pl. 2, fig. 17; pl. 4, fig. 12.

1915. *Rhyssoplax huttoni* Iredale, Trans. N.Z. Inst., 47, 1914, 426.

[1924. *Rhyssoplax huttoni* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd., 77 (N.Z. Moll.), 9. North I., South I., Stewart I., is *S. sinclairi, fide* Finlay, Trans. N.Z. Inst., 57, 1926, 334, from specimens ex Odhner.]

Suter gave an excellent description, as follows: "Shell oblong-ovate, angularly raised, valves striated throughout, jugum smooth, girdle with rounded scales; colour yellowish-olive, dull to dark green or brick-red; interior whitish. The flatly convex anterior valve has seventeen to twenty-four subequal riblets reaching to the apex, and broken up by concentric rugae of growth; sometimes a few riblets are interspersed, which do not extend to the apex; the latter is smooth, and mostly a little excavated posteriorly. The intermediate valves have the jugum smooth, projecting a little behind; the pleural tracts have about twenty to twenty-five furrows on each side, which near the central area are narrow and not deep, but usually widening and deepening on approaching the margin. Sometimes they are in breadth equal to the riblets, but in some specimens they are narrower. They extend the whole length of the pleural areas. The lateral areas are strongly ribbed, the ribs broken up by the continuance of the grooves on the pleural tracts. Their number is very variable—the usual number is three to four, but sometimes as many as five are found—and some of them may be divaricating, which, however, is not the rule. The posterior valve has the mucro very little behind the middle; the central area is flatly convex, with the same furrows as the pleural tracts of the intermediate valves; the posterior slope is concave, and the posterior area has eighteen to twenty strongly granose riblets reaching up to the apex. The girdle bears roundish medium-sized and compactly imbricating polished scales, which under a powerful lens show faint striation. The colour is very variable; the most common is yellowish-olive, then dull green is met with, and one of these specimens has the end valves blackish-green; one specimen is brownish-black, and one brick-red. The girdle has the same colour as the valves; sometimes dark bands of variable width and irregular in distribution may be seen. The interior is mostly bluish-white, pinkish-white in the red specimen. The sinus is deep and narrow, pectinate. The slits on a specimen I disarticulated are: Head-valve 9, intermediate valves 1-1, posterior valve 15. All teeth are blunt and pectinate; those of the tail valve are very unequal in breadth. The valve callus is rather prominent. Divergence, 115°. Length, 34 mm.; breadth, 20 mm. Habitat: Near Dunedin."

So far this species has only been found near Dunedin, records from Wellington referring to *aerea,* and the northern so-called *huttoni* is here recognised as the misunderstood *stangeri.*

58. RHYSSOPLAX CANALICULATA.

(Plate ix., figs. 12, 13.)

1835. *Chiton canaliculatus* Quoy and Gaimard, Voy. de l'Astrol. Zool., iii., 394, pl. 75, figs. 37-42. Tasman Bay, New Zealand. Type in Paris Museum.
1836. *Chiton canaliculatus* Deshayes, Hist. Anim. s. Vert. (Lam.), ed. 2, vii., 502.
1843. *Chiton canaliculatus* Gray, Travels in N.Z. (Dieff.), ii., 246 (coll. by Stanger).
1852. *Chiton insculptus* A. Adams, P.Z.S., 1852, 91, pl. xvi., fig. 4. New Zealand. Type in British Museum.
1872. *Chiton canaliculatus* Hutton, Trans. N.Z. Inst., iv., 1871, 176.
1873. *Chiton canaliculatus* Hutton, Cat. Marine Moll. N.Z., 46.
1873. *Chiton stangeri* Hutton, Cat. Marine Moll. N.Z., 48.
1880. *Chiton stangeri* Hutton, Man. N.Z. Moll., 111.
1880. *Chiton insculptus* Hutton, Man. N.Z. Moll., 112.
1880. *Lepidopleurus canaliculatus* Hutton, Man. N.Z. Moll., 112.
1893. *Chiton canaliculatus* Pilsbry, Man. Conch., xiv., 177, pl. 36, figs. 4, 5-6 (includes *stangeri* and *insculptus* as synonyms).
1897. *Chiton canaliculatus* Suter, Proc. Mal. Soc., ii., 196.
1904. *Chiton canaliculatus* Hutton, Index Faunae N.Z., 86.
1904. *Chiton canaliculatus* (*sic*) Wissel, Zool. Jahrb. Abt. Syst., 20, 655.
1905. *Chiton canaliculatus* Hamilton, Col. Mus. Bull., No. 1, 36.
1905. *Chiton canaliculatus* Nierstrasz, Notes Leyden Mus., xxv., 150.
1909. *Chiton canaliculatus* Suter, Nachr. Blatt. Deutsch. Mal. Gesell., 75.

1910. *Chiton stangeri* Iredale, Proc. Mal. Soc., ix., 102 (type examined = *canaliculatus,* error)
1913. *Chiton canaliculatus* Suter, Man. N.Z. Moll., 37. Atlas, pl. 2, fig. 16; pl. 4, fig. 10.
1915. *Rhyssoplax canaliculata* Iredale, Trans. N.Z. Inst., 47, 1914, 426.
1924. *Rhyssoplax canaliculata* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd., 77 (N.Z. Moll.), 9.
1924. *Rhyssoplax canaliculata* Finlay, Trans. N.Z. Inst., 55, 518 (littoral near Dunedin).

Quoy and Gaimard described this species as follows: "Chiton, elongatus, elevatus, valde carinatus, roseas; valvis triangularibus, longitudinaliter sulcatis, postice crenulatis; pallio tenuissimo squamoso.

"Elégante petite espèce, toujours d'un joli rose, à coquille allongée, rétrécie, élévee, fortement carénée; chaque valve intermédiaire, formant une pointe postérieure. Elles sont fortement striées en long, et ventriculées sur leur bord postérieur. Leur aire laterale est fortifieé d'un triangle bien en relief, qui atteint jusqu'au sommet. Cette espèce de contre-fort a quatre sillons transverses granuleux. Les deux valves terminales ont leurs stries rayonnantes, toutes deux avec dix dents striées, à peine perceptibles dans la postérieure. La coquille recouvrant presque tout le corps, le manteau a peu de développement; il est tapissé de squammes granuleuses extrêmement fines, également rosé, quelquefois taché de brun. Le rouge des aires latérales et du sommet est un peu plus foncé; quelques individus ont des taches triangulaires dans la longueur de ce sommet; d'autres sont verdâtres, maculés de rouge. Le dessous du corps est jaunâtre. On trouve assez souvent cette espéce dans l'anse de l'Astrolabe, à la baie Tasman de la Nouvelle-Zélande. Dimensions: Longueur, 9 lignes. Largueur, 6 lignes. Hauteur, 4 lignes."

A. Adams introduced *Chiton insculptus*: "Shell oblong, much elevated, terminal valves, and the lateral areas of the others radiately ribbed; ribs granular, the granules transverse, rather crowded, obsolete at the margin; umbones keeled; anterior terminal valve umbonated; median area longitudinally strongly lirated; lirae obsoletely rugoso-granulate; median areas red, with two blackish-brown parallel lines down the centre of the valves; mantle with brownish-yellow and brown scales; scales smooth, shining, convex. New Zealand, on dead shells in deep water (Strange)."

Very easily recognisable by its beautiful coloration and striking sculpture, this species is common on the oyster beds of Foveaux Strait, and many specimens have been picked from the dredged oysters. Finlay has, however, recorded specimens from the littoral of Otago.

Twenty years ago Iredale, examining the type of *Chiton stangeri* in the British Museum, in comparison with the shell misidentified at that time, reduced the name to the synonymy of *canaliculatus,* which is incorrect.

Dimensions: 25 x 14 mm.

59. RHYSSOPLAX STANGERI.

(Plate ix., figs. 10, 11.)

1847. *Chiton stangeri* Reeve, Conch. Icon. iv., pl. xxii., sp. and fig. 150. New Zealand (Coll. Stanger). Type in British Museum.

Reeve described this species as follows: "Shell ovate, terminal valves and lateral areas of the rest rayed, with rows of closely packed square appressed granules, central areas smooth in the middle, closely ridged on each side, interstices rather deep; yellow and green, tessellated with green spots; ligament squamately coriaceous.

Habitat: New Zealand; Dr. Stanger. Dedicated to the honour of another eminent traveller in New Zealand, whose name is worthy of being recorded under the present genus."

Suter recognised a shell collected by Iredale and Oliver as *C. stangeri*, and Iredale, comparing the specimen with the Reevean type, found it to be altogether different and named it *suteri*. The type of *stangeri* was found to be very like *canaliculatus*, and was recorded as a synonym. Many shells have now been collected at Tauranga and regarded as *huttoni*, but Finlay upon comparison with true *huttoni* from Dunedin found them to be separable and pointed them out as a new species. His differential features were easily confirmed, and the species was figured as distinct. Only when writing up the description and comparing critically with *canaliculata* which it mostly resembled was it recognised as the missing *stangeri*.

Reeve's description is exact.

The specimens from Tauranga collected by Dr. Bucknill are here described. Coloration generally yellow-greenish, sometimes with darker spots, the girdle banded. Variation will undoubtedly occur, as some valves may be dark green and the jugal ridge paler, with darker lines adjacent.

The anterior valve is very closely rayed with about twenty-five rays, bifurcating towards the edges and cut into square nodules; the outer edges thickened.

The median valves have the lateral areas similarly ribbed, generally four well defined squarely nodulose rays developed from two; the pleural areas are deeply sulcate like those of *canaliculata*, about fifteen distinct ridges crossing the pleura and suddenly dying away, leaving a narrow distinct smooth jugal area.

The posterior valve is as usual similarly sculptured.

The girdle scales are very small and polished, practically smooth to an ordinary lens.

As above noted, they are very near *canaliculata* in the sculpture of the pleural areas, but are easily separated by the definite squarish noduling of the ribs on the anterior and median valves.

Dimensions: 18 x 11 mm.

Station: Attached to large shells of *Mytilus canaliculatus* on sandbanks submerged at lowest tide.

xxii. Genus AMAUROCHITON.

1893. *Amaurochiton* Thiele, Das Gebiss der Schnecken (Troschel), ii., 362. Type by monotypy *Chiton olivaceus* Frembly.

1893. *Poeciloplax* Thiele, Das Gebiss der Schnecken (Troschel), ii., 365. Type by monotypy *Chiton glaucus* Gray.

A very characteristic Neozelanic shell, being the commonest shell after *Sypharochiton*, and even more notable through its striking dark green coloration. It is well defined in its shape, sculpture and girdle scales. The latter differ from those of all the other Neozelanic Loricates in their size and shape, and the South American species, *olivaceus* Frembly, is very closely allied, but much larger. It appears to be indubitably congeneric.

Shell large, rather ovate, sculpture fine, girdle scales peculiar. The insertion-plates are short, finely denticulate, and the slitting is numerous in the end valves, 9-10—14, the median valves having the usual one slit on each side.

60. AMAUROCHITON GLAUCUS.

(Plate ix., figs. 1-7; Plate x., fig. 10.)

1828. *Chiton glaucus* Gray, Spicil. Zool., pt. i., 5. July 1. Hab. ?. Type in British Museum.
1835. *Chiton viridis* Quoy and Gaimard, Voy. de l'Astrol. Zool., iii., 383, pl. 74, figs. 23-28. New Zealand. Type in Paris Museum.
1836. *Chiton quoyi* Deshayes, Hist. Anim. s. Vert. (Lam.), 2nd Ed., vii., 509. New name for Quoy and Gaimard's species.
1843. *Chiton viridis* Gray, Travels in New Zeal. (Dieff.), ii., 246.
1847. *Chiton quoyi* Reeve, Conch. Icon., iv., pl. 13, sp. and fig. 68.
1867. *Lophyrus glaucus* Angas, P.Z.S., 222.
1872. *Chiton quoyi* Hutton, Trans. N.Z. Inst., iv., 1871, 177.
1873. *Chiton quoyi* Hutton, Cat. Marine Moll. N.Z., 47.
1880. *Chiton glaucus* Hutton, Man. N.Z. Moll., 112.
1883. *Chiton glaucus* Hutton, Trans. N.Z. Inst., xv., 1882, 129, pl. xvi., fig. f. (dentition).
1893. *Chiton quoyi* Pilsbry, Man. Conch., xiv., 172, pl. xxxvii., figs. 6-8.
1897. *Chiton quoyi* Suter, Proc. Mal. Soc., ii., 194.
1897. *Chiton aereus* Suter, Proc. Mal. Soc., ii., 195. Manukau Harbour. Not *C. aereus* Reeve.
1904. *Chiton quoyi* Hutton, Index Faunae N.Z., 86.
1905. *Chiton quoyi* Hamilton, Col. Mus. Bull., No. 1, 36.
1905. *Chiton quoyi* var. *limosa* Nierstrasz, Notes Leyden Mus., xxv., 151. April 15, ex Suter MS. N.Z.
1905. *Chiton quoyi* subsp. *limosa* Suter, Journ. Malac., xii., 69. December 30. Manukau Harbour, N.Z.
1913. *Chiton quoyi* and subsp. *limosus* Suter, Man. N.Z. Moll., 34. Atlas, pl. 2, fig. 13.
1913. *Chiton quoyi* subsp. *limosus* Suter, Man. N.Z. Moll., 34.
1914. *Amaurochiton glaucus* Iredale, Proc. Mal. Soc., xi., 38.
1915. *Amaurochiton glaucus* Iredale, Trans. New Zeal. Inst., xlvii., 1914, 422, 426.
1923. *Amaurochiton glaucus* May, Illus. Index Tas. Shells, pl. xvi., fig. 13.
1924. *Amaurochiton glaucus* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd., 77 (N.Z. Moll.), 9.
1926. *Amaurochiton glaucus* Iredale and Hull, Aust. Zool., iv., 256, pl. xxxvii., figs. 1-22.
1927. *Amaurochiton glaucus* Iredale and Hull, Mon. Austr. Loricates, 119, pl. xv., figs. 1-22.

The short description given by Gray reads: " Testa oblonga, convexa, subcarinata, glauca; area centrali regulariter longitudinaliter, laterali valvisque terminalibus radiatim, striatis; margine ———— Inhab. — Mus. Brit. Shell oblong, convex, subcarinate, glaucous green; end valves and lateral area of the middle valves finely and regularly longitudinally grooved; laminae of insertion pectinate. Inside white. Margin destroyed."

A few years later an excellent account was published by Quoy and Gaimard, with beautiful figures, as follows: "Chiton, corpore elongato-ovali, elevato, triangulari, margine squamoso, viridi, albo aut subrubro variegato, subtus lutescenti; valvis tenuissime striatis.

"Petite espéce, ovale, allongée, à dos trés-élévé, triangulaire, avec une caréne obtuse, d'un beau vert uniforme, un peu foncé dans toutes ses parties, quelquefois tapissé de blanchâtre ou de roux ferrugineux. Le dessous du corps est d'un jaune pâle. Le manteau, fort étroit, est revêtu d'écailles fines, arrondies et serrées, également vertes. Le pied est étroit, le voile buccal elargi sur les côtes et touchant le cordon branchial. Tous les osselets sont finement striés d'arriére en avant; les dix (sic) intermédiaires étroits, et de plus un triangle latéral sillonne en long, tandis que les lignes des deux extrêmes vont en rayonnant; le premier a dix dents crénelées, et le dernier quinze. Leur forme est arrondie, tandis que les autres décrivent une voute triangulaire. Les lames d'insertion sont courtes, fortement échancrées, très-finement denticulées sur leurs bords latéraux, et pourvues d'un sillon. Elles sont d'un vert clair, avec une ligne rougeâtre en arrière. Cet Oscabrion est assez répandu dans la Nouvelle-Zélande. On le trouve surtout a l'anse de l'Astrolabe. Nous en avons rapporté un grand nombre, tous à peu près de même taille, c'est-à-dire de quatorze lignes de longueur, sur huit de larguer et quatre de hauteur."

Owing to Quoy and Gaimard selecting a preoccupied name this fine species was renamed by Deshayes, *Chiton quoyi,* and for eighty years it was thus known, though the identity with Gray's species had been recorded. Such an unmistakable form was easily recognised, and consequently there is practically no complication, a narrow small form being mistaken for the missing *aereus* by Suter, and then distinguished as a subspecies. Curiously enough, specimens labelled by Suter having been sent abroad, the first publication was made by Nierstrasz, who wrote: "*Chiton quoyi* var. *limosa.* 1 Exemplar von Neu-Seeland mit der Etikette; var. *limosa* Suter. Diese Varietat ist mir unbekannt. Die Lange beträgt 19 mm., die Breite 13 mm. Die Schalen sind gelbweiss und unregelmässig grün gestreift und gefleckt. Die Schuppen sind weiss, grün oder gelbbraun gefarbt."

Suter's publication took place nearly nine months later, when he recorded: "It differs from the species (*C. quoyi*) in being smaller and narrower, the jugum angled, not carinated, not always smooth, colour yellowish to green, mostly coated with blackish green. Anterior valve with 8, posterior valve with 15 slits, divergence about 100°, against 120° in the species."

Dimensions: Up to 40 x 25 mm.

Living between tide marks in considerable numbers many colour varieties have been met with, but it may be noted that probably these are much more common in the North Island than in the South Island, as some years collecting in the South Island by Iredale and Oliver provided very few colour aberrations, though many thousands of shells were seen.

xxiii. Genus SYPHAROCHITON.

1893. *Sypharochiton* Thiele, Das Gebiss der Schnecken (Troschel), ii., 365. Type by monotypy *Chiton pelliserpentis* Quoy and Gaimard.

1893. *Triboplax* Thiele, Das Gebiss der Schnecken (Troschel), ii., 365. Type by monotypy *T. scabricula* = *C. pelliserpentis* Quoy and Gaimard.

The typical *Sypharochiton* is not confined to New Zealand, but also occurs on the east coast of Australia, from Sydney to the south and west of Tasmania. There is a hiatus in southern New South Wales.

The species are large, round-backed shells with rather crude sculpture (when contrasted with *Rhyssoplax*), and large oval striate girdle scales. The internal features are very characteristic, the short thick teeth of the insertion-plates, very coarsely denticulate, being quite unlike those of any other Neozelanic group, while the large separated scales are also diagnostic. The slitting in the anterior valve is always more than eight, and in the posterior twelve, the median with the usual one on each side. Some small shells are here associated, but more research is necessary to determine their exact relationship.

61. SYPHAROCHITON PELLISSERPENTIS.

(Plate ix., fig. 21.)

1835. *Chiton pelliserpentis* Quoy and Gaimard, Voy. de l'Astrol. Zool., iii., 331, pl. 74, figs. 17-22. Astrolabe Bay, New Zealand. Type in Paris Museum.
1836. *Chiton pelliserpentis* Deshayes, Hist. Anim. s. Vert. (Lam.), ed. 2, vii., 508.
1843. *Chiton pellisserpentis* Gray, Travels in N.Z. (Dieff.), ii., 246.
1847. *Chiton pellisserpentis* Reeve, Conch. Icon., iv., pl. xv., sp. and fig. 84.
1872. *Chiton pellisserpentis* Hutton, Trans. N.Z. Inst., iv., 1871, 176.
1873. *Chiton pellisserpentis* Hutton, Cat. Marine Moll. N.Z., 46.
1880. *Chiton pellisserpentis* Hutton, Man. N.Z. Moll., 111.
1883. *Chiton pellisserpentis* Hutton, Proc. Linn. Soc. N.S.W., xv., 1882, 129, pl. xvi., fig. 1 (dentition).
1886. *Chiton pellisserpentis* Haddon, Rep. Zool. Challenger, xv., Polypl., 22.
1893. *Chiton pellisserpentis* Pilsbry, Man. Conch., xiv., 173, pl. 37, figs. 14-18.
1897. *Chiton pellisserpentis* Suter, Proc. Mal. Soc., ii., 195.
1904. *Chiton squamosus* Wissel, Zool. Jahrb. Abt. Syst., 20, 619. Error only.
1904. *Chiton pellisserpentis* Hutton, Index Faunae N.Z., 86.
1905. *Chiton pellisserpentis* Hamilton, Col. Mus. Bull., No. 1, 36.
1908. *Chiton pellisserpentis* Iredale, Trans. N.Z. Inst., xl., 1907, 375, pl. xxxi. (five-valved aberration).
1909. *Chiton squamosus* Suter, Nachr. Blatt. Deutsch. Malak. Gesell., 74. Correction of Wissel's error.
1913. *Chiton pellisserpentis* Suter, Man. N.Z. Moll., 33. Atlas, pl. 2, fig. 12; pl. 4, fig. 6.
1915. *Sypharochiton pellisserpentis* Iredale, Trans. N.Z. Inst., 47, 1914, 426.
1922. *Sypharochiton pellisserpentis* Ashby, Trans. Roy. Soc. South Austr., xlvi., 579 (type examined ?).
1924. *Sypharochiton pellisserpentis* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd., 77 (N.Z. Moll.), 8.

This, the most common Loricate in New Zealand, was well described by Quoy and Gaimard, as: "Chiton, corpore ovato-rotundo, squamoso, virescenti, lineis nigris notato, subtus luteo; valvis fusco-virescentibus, in medio macula nigra signatis.

"Assez petite espèce, presque orbiculaire, à dos élevé, à manteau peu large sur les côtes, recouvert de fines écailles arrondies, bien imbriquees, verdâtres, marqué de sept à huit lignes brunes transversales, ce qui fait ressembler cette partie à la peau de notre coulevre ordinaire. Le dessous du corps est d'un jaune clair, et le chaperon céphalique légèrement denticulé; on compte environ trente-quatre folioles à chaque branchie, qui le touche presque. Les valves sont finement écailleuses, verdatres, quelquefois légèrement jaunâtres, avec des taches brunes irregulieres sur les côtes, mais toujours marquées, moins les extrêmes, d'un triangle noir au milieu. Elles sont larges, étroites, très-surbaissées, la seconde la plus large de toutes, finement striées, avec un triangle granuleux aux aires laterales. En dessous elles ont une arête arquée verte, et leurs côtés fortement denticulés; les apophyses, étroites, larges, échancrées, sont d'un assez joli vert clair. La première valve a onze dents courtes, striées, la dernière treize; toutes deux ont des granulations qui forment des lignes rayonnantes. Les quatre osselets intermédiaires sont presque de même grandeur; le quatrième a onze lignes d'étendue. Cette espèce, que les lignes transverses de son manteau font un peu ressembler à la précédente, est extrêmement commune dans l'anse de l'Astrolabe, a la Nouvelle-Zélande. Nous croyons en avoir recueilli deux ou trois cents dans un instant. Dimensions: Longueur des plus grands individus, 14 lignes. Largeur, 13 lignes."

Shell of medium size, depressed, round-backed, elongately ovate, girdle scales large ovals, sculpture crude. Coloration somewhat varied, mostly green, brown and black, variously striped, perfect unicolours rare, girdle generally banded, recalling snakeskin, hence the specific name. Anterior valve ribbed, ribs distant, cut into coarse squarish nodules; ribs fifteen to twenty, divaricating at the edges. Lateral areas of the median valves, as also the post-mucronal area similarly sculptured, three or four ribs on the former and twelve to fifteen on the latter. The pleural areas closely longitudinally ridged and crossed with rather deep concentric growth lines. Mucro of the posterior valve elevated, submedian, posterior slope straight. The sculpture may be a little modified, but never reaches the stage of *sinclairi,* and even, if worn, can be separated from that species by means of the striate, not glossy, girdle scales.

Dimensions: 35 x 25 mm.

Station: On or under stones above median tide mark.

62. SYPHAROCHITON SINCLAIRI.

(Plate x., figs. 1, 2.)

1843. *Chiton sinclairi* Gray, Travels in New Zeal. (Dieff.), ii., 263 (mid January). Great Barrier Island, North Island. Type in British Museum.
1847. *Chiton sinclairi* Reeve, Conch. Icon., iv., pl. 22, fig. 143.
1872. *Chiton sinclairi* Hutton, Trans. N.Z. Inst., iv., 1871, 177.
1873. *Chiton sinclairi* Hutton, Cat. Marine Moll. N.Z., 46.
1874. *Chiton (Leptochiton) sinclairi* Smith, Voy. Erebus and Terror, Zool. Moll., 4, pl. i., fig. 17 (type figured).
1880. *Chiton (Leptochiton) sinclairi* Hutton, Man. N.Z. Moll., 111.
1893. *Chiton sinclairi* Pilsbry, Man. Conch., xiv., 174, pl. 36, figs. 1-3.
1897. *Chiton sinclairi* Suter, Proc. Mal. Soc., ii., 196.
1904. *Chiton sinclairi* Hutton, Index Faunae N.Z., 86.
1905. *Chiton sinclairi* Hamilton, Col. Mus. Bull., No. 1, 36.
1913. *Chiton sinclairi* Suter, Man. N.Z. Moll., 35. Atlas, pl. 2, fig. 14; pl. 4, fig. 7.
1915. *Sypharochiton sinclairi* Iredale, Trans. N.Z. Inst., 47, 1914, 426.
1922. *Sypharochiton pellisserpentis* var. *sinclairi* Ashby, Trans. Roy. Soc. South. Austr., xlvi., 579.
1924. *Chiton huttoni* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd., 77 (N.Z. Moll.), 8, *fide* Finlay.

Gray shortly described this beautiful species as follows: "Pale brown, polished, the terminal valves with many, and the lateral area with few indistinct broad nodulose ridges, the central area polished, with pale longitudinal streaks, and with a few short, deep, irregular longitudinal grooves on the hinder edge of the sides. This species is very like *C. pellisserpentis,* but is polished, and the central plates are smooth, except at the outer angles."

This description is quite good when the correct shell is compared, and most local collectors have been able to discriminate it without difficulty, but Ashby confused it, writing: "One of the three (*pelliserpentis*) is quite as carinated as *S. sinclairi* Gray." We have never seen nor heard of a carinated *sinclairi*, whose chief feature is its low round back.

Compared with the preceding species, the ribbing on the anterior valve and lateral areas is much weaker, and the noduling is more or less obsolete, though the growth lines are generally much more pronounced.

The ribbing on the pleural areas is generally obsolescent; when present only a few slight ridges appearing near the lateral edges. The coloration is generally diagnostic, being blackish longitudinally boldly splashed with white. Unicolour varieties are seldom met with. The whole shell is glossy and this applies to the girdle scales, so that whatever state the shell may be in, the girdle scales will determine it. Sometimes a specimen of the preceding species may be met with in which the sculpture is modified, and it may even show a rather shining surface, but upon actual comparison the differences become striking.

Dimensions: Up to 30 x 18 mm.

Station: Between tide marks mainly under stones in rock pools.

63. Sypharochiton torri.

(Plate x., fig. 12.)

1907. *Chiton torri* Suter, Proc. Mal. Soc., vii., 295, fig. 2, in text. Bluff Harbour, New Zealand. Type in Torr Collection, South Australia.

1913. *Chiton torri* Suter, Man. N.Z. Moll., 35. Atlas, pl. 4, fig. 8.

1915. *Sypharochiton torri* Iredale, Trans. N.Z. Inst., 47, 1914, 426.

Suter's description reads: "Shell small, elongate, smooth, dark brown. Anterior valve with eleven indistinct riblets, obsolete in one specimen, crossed by fine growth lines, the whole surface minutely wrinkled. Of the intermediate valves, the first is twice as long as the others; all of them are broadly rounded, smooth, and beaked, the central areas with minute transverse zigzag wrinkles; jugum smooth; lateral areas slightly raised, with concentric ridges, very distinct near the margins, but gradually disappearing towards the centre, the whole minutely wrinkled. Posterior valve with the mucro central, low, posterior slope strongly convex, a few concentric ridges near the margin, surface wrinkled like the other valves. Girdle with small, rounded, smooth, imbricating scales. Colour dark brown, somewhat lighter on the central and lateral areas; girdle darker brown, nearly black. Interior light brown, sinus microscopically denticulate, sutural laminae moderately high, and broadly rounded. Anterior valve with 11 slits, teeth sharp and pectinate, irregular in size. Intermediate valves with one slit on each side. Posterior valve with a low insertion-plate, having 12 slits, the teeth thick and blunt, with one or two grooves on the outside. Length, 9; breadth, 4.5 mm.; divergence, 100°. Habitat: Bluff, South Island (Dr. Torr). It is easily distinguished from all the other New Zealand species of the genus by the almost total smoothness, the small size, and the microscopic wrinkles. It is nearest allied to *C. sinclairi*."

Since collected by Mr. W. R. Oliver, Director of the Dominion Museum, also at the Bluff.

64. Sypharochiton themeropis.

(Plate x., fig. 16.)

1914. *Sypharochiton themeropis* Iredale, Proc. Mal. Soc., xi., 43, pl. ii., fig. 14. March. Sunday Island, Kermadec Group. Type in Canterbury Museum, Christchurch, New Zealand.

1915. *Sypharochiton themeropis* Oliver, Trans. New Zeal. Inst., 47, 1914, 553.

The original description is here reproduced: "Shell small, oval, elevated, keeled, side slopes almost straight, valves beaked, girdle scaly. Colour black; majority of specimens considerably eroded. Anterior valve with sixteen to twenty strictly radial rows of separated tubercles, the intervals minutely pustulose, the pustules being flat-topped and circular. Median valves with their lateral areas showing three or four separated tuberculose radial rows, the intervals pustulose; the pleural areas regularly pustulose, with no arrangement whatever into longitudinal rows. Posterior valve with the mucro elevate, sub-central, slightly anterior, the posterior slope faintly convex. The anterior portion is sculptured as the pleural areas of the median valves, the posterior as the anterior valve, with few strictly radial rows of separated tubercles. Inside coloration dark blue-green. Insertion-plate of anterior valve with ten to twelve slits, the teeth coarsely pectinated and thick; the plate short, but somewhat projecting, and the slits irregular. Teeth pale green. Median valves have the insertion-plate one-slit, the posterior tooth short and stopping very abruptly before reaching the lateral edge of the valve. The sutural laminae are pale green, rounded, low, and widely separated; the tegmentum generally approaches between, but, when the plate is recognisable, it is seen to be strongly denticulate. Posterior valve with the plate very short and somewhat thrown backward; the slits, ten to twelve in number, are very irregular, while the teeth are thick and coarsely pectinate. The girdle is covered with medium size, rounded, a little separated, deeply grooved scales. The grooves number five to seven on a scale. This description is drawn up from a young shell, as old shells are too much eroded for any sculpture to be determined, save the ends of the radial rows of tubercles; such are more elevated than younger shells. Length of type, 9; breadth, 5 mm. Length of largest specimen, 17.5; breadth, 10.5 mm. Habitat: Sunday Island, Kermadec Group. Station: In crevices of rocks between tides. 'A Chiton was procured which had developed most peculiar habits; it lived in crevices of rocks between tide marks, huddling together, half a dozen being found one upon another, so that some did not touch the rock at all. This species was entirely black, and allied to *pellisserpentis* Quoy and Gaimard. . . . .' *Sypharochiton themeropis* differs from *Ch. funereus* in colour, shape, sculpture, girdle scales, and internal structure. *S. themeropis* is a heavy crass shell, whilst *Ch. funereus* is a delicately formed species; the former is always dead black, the latter varies from black to light brown, green, striped forms, etc.; the former is a somewhat elongate oval, the latter is a very broad oval; in the former the anterior valve is radially rowed with tubercles, the rows very distinct and widely separated; in the latter the tubercles are smaller, much more closely packed, and no distinct rows appear; in the former the pustules on the pleural areas of the median valves never show lineal arrangement; in the latter this is generally the case. The girdle scales in *S. themeropis* are deeply grooved with a few grooves; in *Ch. funereus* the girdle scales are finely striate. The dissected specimens compared show that in this state no confusion is possible; in the Kermadec shell the insertion-plates are comparatively long, with thick coarsely pectinated teeth, whilst in *Ch. funereus* the insertion-plates are very degraded, with the teeth very minute, and bearing very fine striae. The differences are so pronounced as to suggest that *Ch. funereus* can scarcely rank in typical *Sypharochiton*, whilst *S. themeropis* needs comparison with the type of that genus. *S. themeropis* can be readily distinguished from *S. pellisserpentis* (Quoy and Gaimard) by its smaller size, grooved girdle scales, and lack of longitudinal sculpture on the pleural areas of the median valves."

65. SYPHAROCHITON FUNEREUS.

(Plate x., figs. 14, 15.)

1912. *Chiton funereus* Hedley and Hull, Proc. Linn. Soc. N.S.W., xxxvii., 279, pl. xiii., figs. 8, 8a. Lord Howe Island. Type in Australian Museum, Sydney.

The original description is here given: "Shell broad, elevated, carinated, side slopes almost straight. Colour dark green or black, rarely red-brown, occasionally flared with lighter. Anterior valve densely covered with small rounded pustules, which tend to radial and concentric arrangement. Posterior valve irregularly pustulose, mucro prominent, in front of the middle. Median valves; lateral areas raised, strongly ribbed with 3-4 pustulose riblets, bifurcating towards the margin; the pustules of the lateral areas extending into the outer angles; central areas finely sculptured with irregular wavy lines. Girdle alternately banded with light and dark; densely clothed with large scales, not polished, striate. Interior deeply bluish-green, sinus broad, shallow; anterior valve having 10-12, median 1-1, and posterior valve 12 slits. Length, 13 mm.; breadth, 9 mm. Station: Under stones on the coral reef and elsewhere at low tide. Habitat: Lord Howe Island (type locality) and Norfolk Island."

xxiv. Genus ONITHOCHITON.

1847. *Onithochiton* Gray, P.Z.S., 65. Type by subsequent designation Gray, P.Z.S., 1847, 168, *Chiton undulatus*.

This is a characteristic genus of the Neozelanic littoral, the brightly coloured clean shell with the broad fleshy non-scaly girdle attracting attention. Shell oval, elevated, smooth and shining, girdle broad and fleshy; eyes present.

The only sculpture is seen in imperfect rays of small nodules on the anterior valve and lateral areas.

Internally the features are well marked; the insertion-plates of the anterior and median valves are short, finely denticulate and regularly slit. eight in anterior valve, one on each side of the median valve, while there is only a callus present in the posterior valve, the mucro being terminal; that this is due to degeneracy is clearly seen by study of juveniles which show a median mucro and a regular but slight insertion-plate.

The well developed "eyes" are a notable feature of this group.

66. ONITHOCHITON NEGLECTUS.

(Plate x., figs. 18, 19.)

1881. *Onithochiton neglectus* Rochebrune, Bull. Soc. Philom. Paris, 7, Ser. v., 120. Wellington, New Zealand. Type in Paris Museum.
1835. *Chiton undulatus* Quoy and Gaimard, Voy. de l'Astrol. Zool., iii., 393, pl. 75, figs. 19-24. Bay of Islands, New Zealand. Type in Paris Museum. Not *Chiton undulatus* Wood.
1836. *Chiton undulatus* Deshayes, Hist. Anim. s. Vert. (Lam.), Ed. 2, vii., 537.
1843. *Acanthopleura undulatus* Gray, Travels in N.Z. (Dieff.), ii., 245.
1847. *Chiton undulatus* Reeve, Conch. Icon., iv., pl. xvi., figs. 87, 90.
185?. *Onithochiton undulatus* H. and A. Adams, Gen. Rec. Moll., 476, pl. 54, fig. 3.
1872. *Tonicia undulata* Hutton, Trans. New Zeal. Inst., iv., 1871, 179.
1873. *Tonicia undulata* Hutton, Cat. Marine Moll. N.Z., 48.
1880. *Tonicia undulata* Hutton. Man. N.Z. Moll., 114.
1881. *Onithochiton astrolabei* Rochebrune, Bull. Soc. Philom. Paris, 7th Ser., v., 120. New Zealand (Quoy and Gaimard). Type in Paris Museum.
1881. *Onithochiton filholi* Rochebrune, Bull. Soc. Philom. Paris, 7th Ser., v., 120. Cook Straits, N.Z. Type in Paris Museum.

1882. *Onithochiton decipiens* Rochebrune, Bull. Soc. Philom. Paris, 7th Ser., vi., 196. Cook Straits, N.Z. Type in Paris Museum.
1893. *Onithochiton undulatus* Pilsbry, Man. Conch., xiv., 245, pl. lv., figs. 14-16.
1893. *Onithochiton semisculptus* Pilsbry, Man. Conch., xiv., 247, pl. 55, figs. 10-11. Habitat unknown. Type in Acad. Nat. Sci., Philadelphia.
1893. *Onithochiton filholi* Pilsbry, Man. Conch., xv., 106 (translation).
1893. *Onithochiton decipiens* Pilsbry, Man. Conch., xv., 106.
1893. *Onithochiton neglectus* Pilsbry, Man. Conch., xv., 106.
1893. *Onithochiton astrolabei* Pilsbry, Man. Conch., xv., 107.
1897. *Onithochiton undulatus* Suter, Proc. Mal. Soc., ii., 199.
1904. *Onithochiton undulatus* Hutton, Index Faunae N.Z., 86.
1904. *Onithochiton semisculptus* Hutton, Index Faunae N.Z., 86.
1905. *Onithochiton undulatus* Hamilton, Col. Mus. Bull., No. 1, 36.
1905. *Onithochiton undulatus* Nierstrasz, Notes Leyden Mus., xxv., 157.
1905. *Onithochiton semisculptus* Suter, Journ. Malac., xii., 71 (recognised from Chatham I.).
1910. *Onithochiton filholi* Iredale, Proc. Mal. Soc., ix., 154.
1913. *Onithochiton semisculptus* Suter, Man. N.Z. Moll., 48. Atlas, pl. 2, fig. 23.
1913. *Onithochiton undulatus* Suter, Man. N.Z. Moll., 49. Atlas, pl. 2, fig. 24; pl. 5, fig. 5.
1915. *Onithochiton neglectus* Iredale, Trans. New Zeal. Inst., 47, 1914, 423, 426.
1922. *Onithochiton neglectus, undulatus, astrolabei* Ashby, Trans. Roy. Soc. South Austr., xlvi., 582 (types examined ?).
1924. *Onithochiton neglectus* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd., 77 (N.Z. Moll.), 9.

The excellent description and figures given by Quoy and Gaimard allowed easy recognition of this striking Loricate, and the invalidity of their chosen name was temporarily ignored. Their account reads:—

"Chiton, corpore parvo. subcarinato, margine griseo vel rubente, tomentoso; valvis cordiformibus, postice acutis, levibus, roseis vel rubescentibus, undulatis transversimque lineolatis.

"Cette petite espèce tient, au premier aspect, de l'Oscabrion lamelleux, dans sa variété verdâtre, dont les linéoles simulent des stries. Elle est courte, ovalaire, à dos élevé, caréné. Les valves intermédiaires sont uniformes, un peu en coeur, pointues en arrière, la seconde la plus ample de toutes. Elles sont complétement lisses, polies, rosées, ou légèrement verdâtres et marquées de linéoles transverses, ondulées, de l'une ou l'autre couleur, selon celle du fond. On remarque à la loupe, sur les aires latérales, des rangées longitudinales de points noirs; ils recouvrent la première valve. Quelques individus ont une teinte rosée au milieu, et des taches vertes sur les côtes. Le manteau, assez large, est rougeâtre et rendu tomenteux par une foule de petits poils courts. La première valve a neuf dents ciliées; la dernière en manque à sa lame d'insertion. Les autres apophyses ont une échancrure arrondie, et toutes les valves sont marquées, à l'interieur, d'un triangle couleur de rose, caractère qui suffirait pour faire distinguer cette espèce remarquable par l'élégance et la disposition de ses couleurs. Le pied est rose pâle ou jaunâtre; on compte vingt-neuf lamelles branchiales de chaque côte, assez distants du chaperon céphalique. Ils perdent dans la liqueur leur couleur rosée, mais conservent fort bien la verte. Ils sont assez communs à la baie des Iles de la Nouvelle-Zélande. Dimensions: Longueur, 11 lignes. Largueur, 7 lignes. Hauteur, 3 lignes."

No complications whatever ensued until the erratic and irresponsible Rochebrune ran riot among these shells in the Paris Museum. Using a classification of his own which has defied interpretation, he lost, mislaid and transferred labels and specimens, describing the types of former workers under different genera and then renaming his own new species until there is no confidence in any specimens of this class in that Museum. Thiele examined the material and made possible some determinations, and later Iredale critically studied the series, with the result that, while some forms were fairly recognisable, others were seen to be absolutely indeterminable. Then Dupuis came along and completed Rochebrune's work, labelling and disarranging and distributing the original material so that the data allotted is now worse than valueless. Ashby then glanced at the collection and gave some notes on the supposed types, but it is obvious that he was simply following Dupuis' valueless arrangement, and it would be wise to ignore all these reports at the present time. The fact that Dupuis selected unique types (probably unwittingly) for his own collection indicates his ignorance of their value.

Rochebrune's attack on the present species reads (using Pilsbry's translations for convenience of comparison) :—

"*Onithochiton neglectus*. Shell ovate-elliptical, subcarinated; brown with scattered buff or buffish maculae. Anterior valve and posterior part of the posterior valve most minutely granulose. Intermediate valves having the central areas smooth, lateral areas radially granose. Marginal ligament very wide, brown, satiny. Length, 26 mm.; breadth, 17 mm. Wellington, New Zealand (Quoy and Gaimard). Rare. Paris Museum."

"*Onithochiton astrolabei*. Shell ovate; rubescent or green, conspicuously ornamented with concentric brown lines. Valves transversely rather narrowed, smooth. Lateral areas obscurely lirate, longitudinally and laterally lineated, the lines granulose. Marginal ligament wide, brownish, silky. Length, 16 mm.; width, 10 mm. New Zealand (Quoy and Gaimard). Rare. Paris Museum."

"*Onithochiton filholi*. Shell ovate, wide, subcarinated; intense olivaceous concentrically ornamented with alternating buff and green lines. Anterior valve radially striated; posterior part of posterior valve lightly sulcate. Intermediate valves smooth on the central areas; the lateral areas most minutely radially striated, at the posterior part, strongly and concentrically bi-lirate. Marginal ligament wide, rubescent, silky. Length, 29 mm.; width, 18 mm. Cook Straits (Filhol). Common. Paris Museum."

"*Onithochiton decipiens*. Shell ovate, wide, subcarinate; olivaceous ornamented with concentric buff lines. Anterior valve radially striated; intermediate valves having the central areas smooth; lateral areas radially most minutely striated, laterally concentrically bi-lirate. Ligament wide, rubescent, silky. Length, 29 mm.; width, 18 mm. Cook Straits (Filhol). Rare. Paris Museum."

It is obvious that the last is merely a repetition of the one preceding, and that the two before are based on the original specimens collected by Quoy and Gaimard.

Pilsbry relegated all these to an Appendix of insufficiently described species, and then introduced as new:—

"*Onithochiton semisculptus*. Shell oblong, elevated, subangular, dark olive-green, having snowy angular lines and dots on the lateral areas, and closer, more regular transverse lines on central areas. Surface shining and smooth on the central areas, closely and finely striated radially on the head valve and lateral areas, the striae crowded and subgranose, about 12 in number, on each lateral area. Interior white. Girdle narrow, brown. Length, 27½ mm.; breadth, 16 mm. Divergence about 95°. Habitat unknown. This species resembles the stout, elevated, dark olive forms of *O. undulatus*, such as occur at Auckland, N.Z., in contour and coloration. It differs markedly from *undulatus*, and all other known species in the sculpture of the lateral areas."

Some years later Suter recognised the Chatham Island form as agreeing with Pilsbry's description, and therefore used his name. However, similar shells occur commonly on the mainland, and there is no doubt that this curious variation is not geographic as present material proves. Further, the Rochebrune descriptions particularise the same details as emphasised by Pilsbry.

It is possible that the Chatham Island form may be separable as it is larger and generally shows more distinctly the "*semisculptus*" features. Dimensions: 46 x 25 mm. (Suter).

Dimensions: 35 x 21.

Station: On or under stones between tide marks.

67. ONITHOCHITON SUBANTARCTICUS.

(Plate x., fig. 13.)

1907. *Onithochiton undulatus* Quoy and Gaimard, var. *subantarcticus* Suter, Trans. New Zeal. Inst., xxxix., 1906, 268. Auckland Islands. Type in Coll. Suter, now in Wanganui Museum, N.Z.
1909. *Onithochiton undulatus subantarcticus* Suter, Subant Islands, N.Z., i., 4.
1910. *Onithochiton subantarcticus* Iredale, Proc. Mal. Soc., ix., 153.
1913. *Onithochiton undulatus* var. *subantarcticus* Suter, Man. N.Z. Moll., 49.
1915. *Onithochiton subantarcticus* Iredale, Trans. N.Z. Inst., 47, 1914, 426.
1926. *Onithochiton subantarcticus* Finlay, Trans. N.Z. Inst., 57, 335.

Suter only introduced this: "At the Auckland and Campbell Islands there occurs a very constant colour variety, chocolate brown, which certainly deserves a varietal name. Sometimes one or several intermediate valves are transversely banded with white. The girdle is always buff coloured. Type from the Auckland Islands in my collection." In the Manual he still regarded it as a colour variation, adding: "Cook Strait and New Brighton, but rare."

Iredale pointed out that the additional localities were erroneous and referable to a different unnamed species. Finlay collected this latter and also confused it (Trans. N.Z. Inst., 55, 1924, 521), but later corrected this determination and admitted *subantarcticus* as a distinct species.

All the specimens examined are dark coloured, smooth on the lateral areas, no pustules being seen at all, elevated, and the teeth are very short.

68. ONITHOCHITON OPINIOSUS, *sp. nov.*

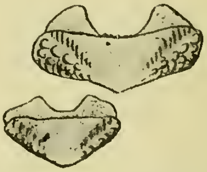
(Plate x., fig. 20.)

Under kelp roots, especially in Otago, in addition to *Frembleya egregia*, and whose characteristic station this is, an *Onithochiton* commonly occurs. It is superficially very different to the common form, as it is very depressed, the valves narrow, and entirely smooth. Ocelli are also very few and scarcely noticeable. The valves are much deeper than those of the common shell, and the insertion-plates are longer, while the sutural laminae are strongly developed, and internally there is a great formation of callus, apparently to counteract the attacks of some microscopic living animals. This may be an ecologic variant, but offers such distinct features that it is here named.

69. ONITHOCHITON MARMORATUS.

(Plate x., fig. 11.)

1904. *Onithochiton marmoratus* Wissel, Zool. Jahrb. Syst., xx., 660, figs. 67-69. New Zealand. Type in Nat. Hist. Mus., Bremen.
1907. *Onithochiton nodosus* Suter, Proc. Mal. Soc., vii., 297, fig. 4 in text. Foveaux Strait, New Zealand. Type in Coll. Suter, now in Wanganui Museum.
1909. *Onithochiton marmoratus* Suter, Nachr. Blatt. Deutsch. Malak. Gesell., xli., 75.
1910. *Onithochiton marmoratus* Thiele, Revision Chitonen, pt. ii. (Zoologica Chun, heft 56), 99, pl. 10, figs. 64-67.
1913. *Onithochiton nodosus* Suter, Man. N.Z. Moll., 47. Atlas, pl. 5, fig. 4.
1913. *Onithochiton marmoratus* Suter, Man. N.Z. Moll., 1081.
1915. *Onithochiton marmoratus* Iredale, Trans. N.Z. Inst., 47, 1914, 426.
1924. *Onithochiton marmoratus* Odhner, Vidensk. Medd. Dansk. Nat. Foren. Bd., 77 (N.Z. Moll.), 9. North Is.



Copy of Thiele's figures of type of *O. marmoratus* Wissel.

Suter described an extraordinary little shell as follows: "Shell small, elongately ovate, shining, flesh colour, variegated with white and brown, lateral areas with nodulous ribs. Anterior valve with about 20 radiating nodulous riblets, crossed by four concentric furrows; about 14 radiate rows of minute silvery eyes. Intermediate valves slightly beaked, with the jugum sharply rounded; central areas minutely punctate, with longitudinal ridges in front of the lateral areas, short near the centre, but extending nearly the whole length on approaching the margins; several transverse furrows extend over the central areas and jugum. Lateral areas scarcely raised, with three nodulous ribs, the two posterior ones close together, sutures slightly crenulated; one row of eyes between the first and second rib. Posterior valve with the mucro terminal, minutely punctate, a concentric marginal row of nodules, interspersed with eyes. Girdle narrow, leathery (dry specimen!), with narrow white stripes below the sutures: colour light pink over the jugum, minutely dotted with white, margined by rows of triangular white spots; central and lateral areas reddish brown, variegated with white on some of the intermediate valves. Anterior valve with 10 irregularly spaced slits, teeth pectinate; intermediate valves with one slit on each side; posterior valve with a low, smooth, and rounded callus. Length, 17 mm.; breadth, 7 mm.; divergence, 70°. Habitat: Foveaux Strait in 18 fathoms (one specimen)."

A couple of years later Suter came across and criticised an essay by Wissel, who wrote a paper full of inexcusable blunders, not even placing the species in their right families. Wissel had described an *Onithochiton marmoratus*, and Suter recognised in the description only a colour variation of the variable *O. undulatus*, a conclusion merited by the description. From examination of Wissel's type, however, Thiele was able to show that it was the species described as *nodosus* by Suter. Thiele gave figures supporting this conclusion, and explained that Wissel had not described the sculpture (the only characteristic of the species) amongst other errors. It is unfortunate that such a name should be allowed to take precedence, but Suter acknowledged the identity.

70. ONITHOCHITON OLIVERI.

(Plate x., fig. 17.)

1914. *Onithochiton oliveri* Iredale, Proc. Mal. Soc., xi., 46, pl. ii., fig. 11. Sunday Is., Kermadec Group. Type in Canterbury Museum, Christchurch, New Zealand.

1915. *Onithochiton oliveri* Oliver, Trans. N.Z. Inst., 47, 1914, 558.

Iredale's description is here reprinted: "Shell of medium size, rather broadly oval, slightly keeled, girdle densely spiculose. Coloration variable; dark green with lighter marblings being normal; one small shell is dark chocolate, varied with cream and pink, whilst another is bright vermilion with cream markings. The whole shell is absolutely smooth and glossy, a few growth lines only showing, the lateral areas of the median valves being indicated by a slight elevation. On the anterior valve twenty to twenty-five irregular radiating rows of eyes, about ten eyes to a row, can be counted. On the lateral areas one row, often doubled and trebled, can be noted. Inside coloration pinkish white, the anterior valve with two reddish-brown marks on posterior edge; the first median valve with a large red-brown blotch similarly placed, which is more or less extensive on the succeeding valves, but absent from the posterior valve. Anterior valve with projecting plate regularly eight-slit, the teeth beautifully pectinate. Median valves with large sutural laminae, higher near the sinus, which is clearly denticulate. Insertion-plate one-slit and pectinate. Posterior valve with the insertion-plate reduced to a callus, beyond which the tegmentum extends. Girdle covered with long sharp pointed, glassy spikes. Length of type, 24 mm.; breadth, 15 mm. Habitat: Sunday Island, Kermadec Group. Station: Living in crevices of rocks between tide marks. Remarks: This species is closely related to *Onithochiton filholi* Rochebrune (= *undulatus*, auct.) from which it is at sight separable by the girdle characters. Every specimen found was perfectly smooth, and showed no approach to the ribbing, which caused the '*semisculptus*' confusion in the case of the Neozelanic species."

71. ONITHOCHITON DISCREPANS.

(Plate x., figs. 3-9.)

1912. *Onithochiton discrepans* Hedley and Hull, Proc. Linn. Soc. N.S.W., xxxvii., 280, pl. xiii., fig. 9a, fig. 1. December 13. Lord Howe Island. Type in Australian Museum, Sydney.

The original description is given: "Shell elevated, the dorsal ridge rounded. Colour olive buff, variably flamed with orange, wood-brown and green. The colour of different specimens varies considerably; in some the orange predominates, others are chiefly green. Anterior valve having 8 or 9 radiating ribs, distinctly raised, and concentrically grooved, separating 9 or 10 rows of ocelli; the posterior margin of the valve with smooth thickened ridge. Posterior valve smooth, mucro posterior. Median valves moderately beaked, the lateral areas raised, radially grooved by 4 to 6 furrows; rows of ocelli between the anterior rib and the furrows. Central areas with shallow sulci, originating at and denticulating the anterior rib and vanishing towards the margin. Girdle leathery, two-thirds the width of exposed portion of valves, pale yellow, veined with orange brown;

densely clothed with microscopic down. Interior pearly white; sinus broad, deep, denticulate. Anterior valve having 8 and median valves 1-1 slits. Length, 19 mm.; breadth, 12 mm. Station: In interstices of waterworn fragments of coral rock, or attached to the rocky sides of pools in the reef at low tide. Habitat: Lord Howe Island. Remarks: Compared with the Australian O. *quercinus*, the new species is apparently far smaller. In the median valves of O. *discrepans* the eye rows part radial from transverse ridges, whereas uninterrupted transverse ridges prevail in O. *quercinus*. The anterior valve of the Australian form is concentrically furrowed, but in the Lord Howe Island species radial ridges are dominant."

It may be recorded that in this case the Lord Howe Island shell is quite unlike the Kermadec one, which is closely related to the New Zealand common species, but is more like the Australian subtropical series. The relationships of the species of *Onithochiton* would form an interesting study.

EXPLANATION OF PLATE VII.

Fig. 1. *Plaxiphora aurata* Spalowsky, whole shell.
„ 2. *Plaxiphora aurata* Spalowsky, exterior of anterior valve.
„ 3. *Plaxiphora aurata* Spalowsky, exterior of median valve.
„ 4. *Plaxiphora aurata* Spalowsky, exterior of posterior valve.
„ 5. *Plaxiphora aurata* Spalowsky, interior of posterior valve.
„ 6. *Maorichiton caelatus* Reeve, whole shell.
„ 7. *Maorichiton lyallensis* Mestayer = juvenile *caelatus* Reeve.
„ 8. *Maorichiton schauinslandi* Thiele, whole shell.
„ 9. *Maorichiton mixtus* Iredale, whole shell.
„ 10. *Maorichiton mixtus* Iredale, exterior of median valve.
„ 11. *Maorichiton mixtus* Iredale, exterior of posterior valve.
„ 12. *Maorichiton mixtus* Iredale, interior of posterior valve.
„ 13. *Vaferichiton murdochi* Suter, whole shell.
„ 14. *Vaferichiton murdochi* Suter, girdle scales.
„ 15. *Diaphoroplax biramosa* Quoy & Gaimard, whole shell.
„ 16. *Diaphoroplax biramosa* Quoy & Gaimard, exterior of anterior valve.
„ 17. *Guildingia obtecta* Pilsbry, whole shell.
„ 18. *Guildingia obtecta* Pilsbry, exterior of anterior valve.
„ 19. *Guildingia obtecta* Pilsbry, interior of anterior valve.
„ 20. *Guildingia obtecta* Pilsbry, exterior of posterior valve.
„ 21. *Guildingia obtecta* Pilsbry, interior of posterior valve.
„ 22. *Guildingia obtecta* Pilsbry, exterior of median valve.
„ 23. *Guildingia obtecta* Pilsbry, interior of median valve.

EXPLANATION OF PLATE VIII.

Fig. 1. *Frembleya egregia* H. and A. Adams, whole shell.
„ 2. *Frembleya egregia* H. and A. Adams, exterior of posterior valve.
„ 3. *Frembleya egregia* H. and A. Adams, interior of posterior valve.
„ 4. *Frembleya egregia* H. and A. Adams, exterior of median valve.
„ 5. *Frembleya egregia* H. and A. Adams, interior of median valve.
„ 6. *Frembleya egregia* H. and A. Adams, exterior of anterior valve.
„ 7. *Frembleya egregia* H. and A. Adams, interior of anterior valve.
„ 8. *Frembleya egregia* H. and A. Adams, side view of posterior valve.
„ 9. *Hemiarthrum hamiltonorum* Iredale & Hull, whole shell.
„ 10. *Hemiarthrum hamiltonorum* Iredale & Hull, exterior of posterior valve.
„ 11. *Hemiarthrum hamiltonorum* Iredale & Hull, exterior of anterior valve.

Fig. 12. *Hemiarthrum hamiltonorum* Iredale & Hull, interior of posterior valve.
„ 13. *Hemiarthrum hamiltonorum* Iredale & Hull,, interior of anterior valve.
„ 14. *Hemiarthrum hamiltonorum* Iredale & Hull, exterior of median valve.
„ 15. *Hemiarthrum hamiltonorum* Iredale & Hull, interior of median valve.
„ 16. *Rhyssoplax aerea* Reeve (juv. = type of *oliveri* Mestayer).
„ 17. *Tegulaplax howensis* Hedley & Hull, whole shell.
„ 18. *Tegulaplax howensis* Hedley & Hull, exterior of anterior valve.
„ 19. *Tegulaplax howensis* Hedley & Hull, exterior of posterior valve.
„ 20. *Tegulaplax howensis* Hedley & Hull, interior of posterior valve.
„ 21. *Tegulaplax howensis* Hedley & Hull, interior of anterior valve.
„ 22. *Tegulaplax howensis* Hedley & Hull, interior of median valve.
„ 23. *Tegulaplax howensis* Hedley & Hull, exterior of median valve.
„ 24. *Tegulaplax howensis* Hedley & Hull, girdle scales.
„ 25. *Rhyssoplax aerea* Reeve, whole shell.
„ 26. *Rhyssoplax aerea* Reeve, sculpture of median valve (Auckland Islands).
„ 27. *Rhyssoplax aerea* Reeve, sculpture of median valve (Tauranga).
„ 28. *Rhyssoplax suteri* Iredale, whole shell.
„ 29. *Rhyssoplax suteri* Iredale, sculpture of median valve.

EXPLANATION OF PLATE IX.

Fig. 1. *Amaurochiton glaucus* Gray, whole shell.
„ 2. *Amaurochiton glaucus* Gray, exterior of anterior valve.
„ 3. *Amaurochiton glaucus* Gray, interior of anterior valve.
„ 4. *Amaurochiton glaucus* Gray, exterior of posterior valve.
„ 5. *Amaurochiton glaucus* Gray, interior of posterior valve.
„ 6. *Amaurochiton glaucus* Gray, exterior of median valve.
„ 7. *Amaurochiton glaucus* Gray, interior of median valve.
„ 8. *Rhyssoplax huttoni* Suter, whole shell.
„ 9. *Rhyssoplax huttoni* Suter, exterior of half of median valve.
„ 10. *Rhyssoplax stangeri* Reeve, whole shell.
„ 11. *Rhyssoplax stangeri* Reeve, exterior of half of median valve.
„ 12. *Rhyssoplax canaliculata* Quoy & Gaimard, whole shell.
„ 13. *Rhyssoplax canaliculata* Quoy & Gaimard, exterior of half of median valve.
„ 14. *Rhyssoplax exasperata* Iredale, whole shell.
„ 15. *Rhyssoplax whitleyi* Iredale & Hull, whole shell.
„ 16. *Rhyssoplax whitleyi* Iredale & Hull, exterior of half of median valve.
„ 17. *Rhyssoplax coryphea* Hedley & Hull, whole shell.
„ 18. *Rhyssoplax coryphea* Hedley & Hull, exterior of anterior valve.
„ 19. *Rhyssoplax coryphea* Hedley & Hull, exterior of median valve.
„ 20. *Rhyssoplax coryphea* Hedley & Hull, posterior valve.
„ 21. *Sypharochiton pelliserpentis* Quoy & Gaimard, whole shell.

EXPLANATION OF PLATE X.

Fig. 1. *Sypharochiton sinclairi* Reeve, whole shell.
„ 2. *Sypharochiton sinclairi* Reeve, girdle scales.
„ 3. *Onithochiton discrepans* Hedley & Hull, exterior of posterior valve.
„ 4. *Onithochiton discrepans* Hedley & Hull, exterior of anterior valve.
„ 5. *Onithochiton discrepans* Hedley & Hull, interior of posterior valve.
„ 6. *Onithochiton discrepans* Hedley & Hull, exterior of median valve.

Fig. 7. *Onithochiton discrepans* Hedley & Hull, interior of median valve.
„ 8. *Onithochiton discrepans* Hedley & Hull, interior of anterior valve.
„ 9. *Onithochiton discrepans* Hedley & Hull, whole shell.
„ 10. *Amaurochiton glaucus* Gray, girdle scales.
„ 11. *Onithochiton marmoratus* Wissel, whole shell.
„ 12. *Sypharochiton torri* Suter, whole shell.
„ 13. *Onithochiton subantarcticus* Suter, whole shell.
„ 14. *Sypharochiton funereus* Hedley & Hull, whole shell.
„ 15. *Sypharochiton funereus* Hedley & Hull, half of median valve.
„ 16. *Sypharochiton themeropis* Iredale, whole shell.
„ 17. *Onithochiton oliveri* Iredale, whole shell.
„ 18. *Onithochiton neglectus* Rochebrune, whole shell.
„ 19. *Onithochiton neglectus* Rochebrune, half of median valve.
„ 20. *Onithochiton opiniosus* Iredale & Hull, median valve.

BIRDLAND FILMS.

Members who attended the January meeting of the Ornithological Section enjoyed one of the most successful exhibitions of "birdland" films ever placed before them. Mr. Norman Chaffer, who has for several years past been engaged in studying and taking "still" photographs of the Bower-Birds in National Park, has now turned his attention to cinematography, with most gratifying results. Opening with a charming film of the Rufous Fantail feeding a young Square-tailed Cuckoo, he showed a delightful reel in which the foster parents displayed their wonderful activity and the fascinating play of their fanshaped tails, while they fed the clamorous Cuckoo with insects. This was followed by a remarkable film showing the Brown Warbler building its pensile nest, and weaving the webs and bark into the overhanging portico above the entrance. The gem of the evening, however, depicted the Satin Bower-Bird constructing his bower by pressing the sticks into the ground and bending them over at the desired angle; painting them with a brush of stringy bark saturated with pigmented mud; and placing bright objects as ornaments at each entrance to the bower. The day on which the film was taken was rather windy, and the play of light and shade, as the shadows of the gum boughs passed over the bower, produced a remarkably natural effect. As the bright sunlight fell on the glossy plumage of the bird it showed almost a brilliant white in the picture. The whole entertainment was vastly appreciated, and when Mr. Kinghorn displayed a British film depicting the life of the Kestrel, the opinion was unanimously expressed that the local amateur production was equal if not superior to the best of the British professional nature films.

It may be appropriate here to recount an incident in Mr. Chaffer's experience in bird photography. A Melbourne publisher (with a German appellation) of bird "studies" wrote to the section asking for a photograph of the Bower-Bird in its bower for inclusion in a sketch to be published by the writer. Mr. Chaffer very kindly supplied one of his best photographs, but it was returned with the following comments: "I was very disappointed about this photo—a bower-bird, stuffed, also an occasional one, in a bower, perhaps an occasional one, too? That kind of photos. I don't want. . . . I hope that you will understand that I don't like to poke fun at anybody with stuffed birds; for such kind of people my articles are not written."

Possibly the brilliant blue eye of the Bower-Bird, which appears white in a photograph, deceived the casual writer of the letter, but ignorance does not excuse impertinence, although they are often found in conjunction.